CDM Camp Dresser & McKee

Report

Indiana Department of Environmental Management

Continental Steel Superfund Site Remedial Investigation

Volume VI

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APPENDIX C

Air Impact Analysis for the Main Plant

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Appendix C
Air Impact Analysis for the Main Plant

1 Purpose

The air impact analysis was performed to determine off-site concentrations of three air pathway chemicals of concern, lead, chromium and cadmium, for the Continental Steel Superfund Site (CSSS) Main Plant in Kokomo, Indiana.

This analysis provides a conservative estimate of the downwind concentrations of airborne compounds associated with fugitive dust movement from the CSSS Main Plant. This analysis is based on current conditions and will be used in conjunction with current levels of chemicals of concern in the soils to evaluate risks. It is not within the scope of this investigation to evaluate distributions resulting from stack emissions during plant operations nor to evaluate risks during the plant's active period of operation. Conservative assumptions for pollutant concentrations, emission estimates and dispersion techniques were used to estimate the potential maximum off-site concentrations of the chemicals of concern originating from the Main Plant. The resulting predicted off-site impacts are used to perform the health risk assessment for the air pathway and are compared to measured values at three monitoring stations and proposed Indiana air toxics standards.

1.1 Emission Estimating

On-site soil particles are entrained into the air by wind blowing across the ground surface. Entrainment of the contaminated soil is the primary release mechanism for the chemicals of concern to the air pathway. Since the chemicals of concern are not volatile at ambient temperature and pressure, volatilization from soil is not a viable release mechanism. The cadmium, chromium and lead in the soil are assumed to become airborne with the soil. Emissions of cadmium, chromium and lead are estimated from contaminated soil concentrations both inside and outside the CSSS Main Plant buildings. Estimates of emissions from the buildings and outside areas are calculated separately.

1.1.1 Estimated Soil Concentrations for Chemicals of Concern

Soil concentrations of the chemicals of concern were based on the results of surface soil samples collected at the 94-acre Main Plant superfund site (Ecology and Environment Inc. 1994). Dot plots provided as **Figures 1** through **5**, show chromium and lead concentrations for soil samples collected both inside and outside the Main Plant buildings and cadmium soil sample concentrations for

outdoor samples. The dot plots were used to spatially develop outside areas with a similar range of soil concentrations and to estimate soil concentrations for the buildings and outside areas.

One concentration was chosen to represent each modeled building and outside area. The estimated soil concentration of a given building or area was chosen as the midpoint of the range of the highest soil samples in that area. For example, if the highest lead samples were in the range 5,000 to 10,000 mg/kg, 7,500 mg/kg was chosen to represent that area. Because cadmium was reported above the detection limit in only one location, the actual sample concentration of cadmium was used to represent that area.

1.1.2 Estimate of Wind-Induced Soil Erosion

For both building and area sources, estimates of wind-induced soil erosion are based on the U.S. EPA Fourth Edition AP-42 Guidance Document, Compilation of Air Pollutant Emission Factors, published in 1985. The 1995 AP-42 Fifth Edition method for estimating wind-induced soil erosion was not used because the period of disturbance, a required input for this method, is not defined for the CSSS Main Plant site since the soil is not being moved or excavated. However, both methods produce a comparable emission factor when 12 disturbances per year are assumed.

The 1985 AP-42 Fourth Edition method for estimating emissions from erosion of surface soil identifies the emission factor as follows:

$$E_s=1.9\ (s/1.5)\ (365-p)/235\ (f/15)$$

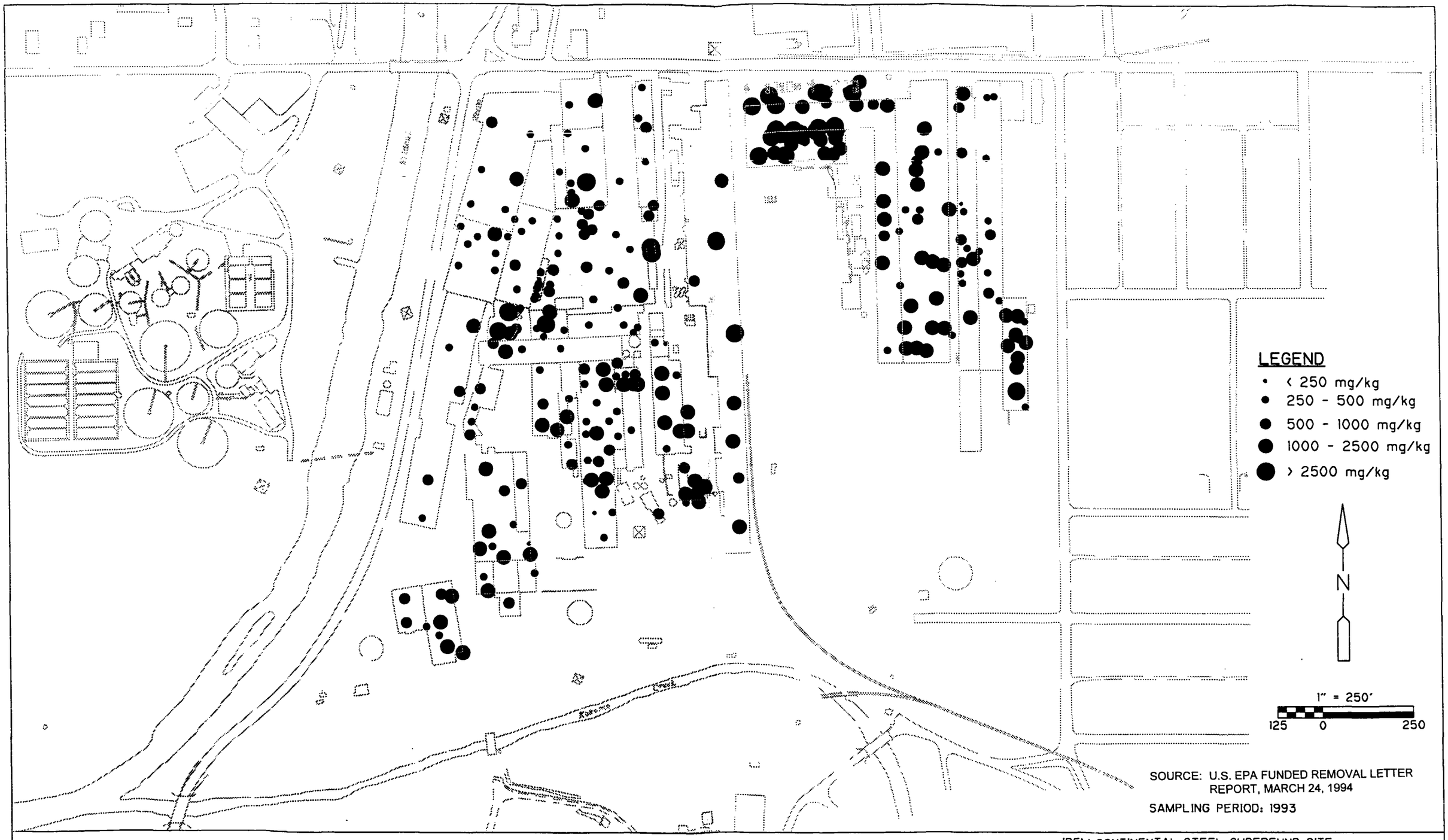
where

E_s = total suspended particulate emission factor (kg/day/hectare)
s = silt content of aggregate
p = number of days with >= 0.25 mm of precipitation per year
f = percentage of time that the unobstructed wind speed exceeds 5.4 m/s

The silt content of aggregate is the proportion of dry aggregate material that passes through a 200 mesh screen using the ASTM-C-136 method. This method was not performed at CSSS. The silt content of the soil at the CSSS Main Plant is assumed to be 6 percent based on mean values for slag and overburden provided in the AP-42 documentation.

The mean number of days per year with greater than or equal to 0.25 millimeters of precipitation is estimated at 123 days based on the National Oceanic and Atmospheric Administration data provided in the Climates of the States (1980) for the 30-year period between 1941 and 1970 for Indianapolis, Indiana.

The percentage of time that the unobstructed wind speed exceeds 5.4 meters per second is estimated at 25 percent based on wind roses developed from the National Climatic Data Center surface meteorological data for Indianapolis, Indiana for the period of 1988 through 1991.



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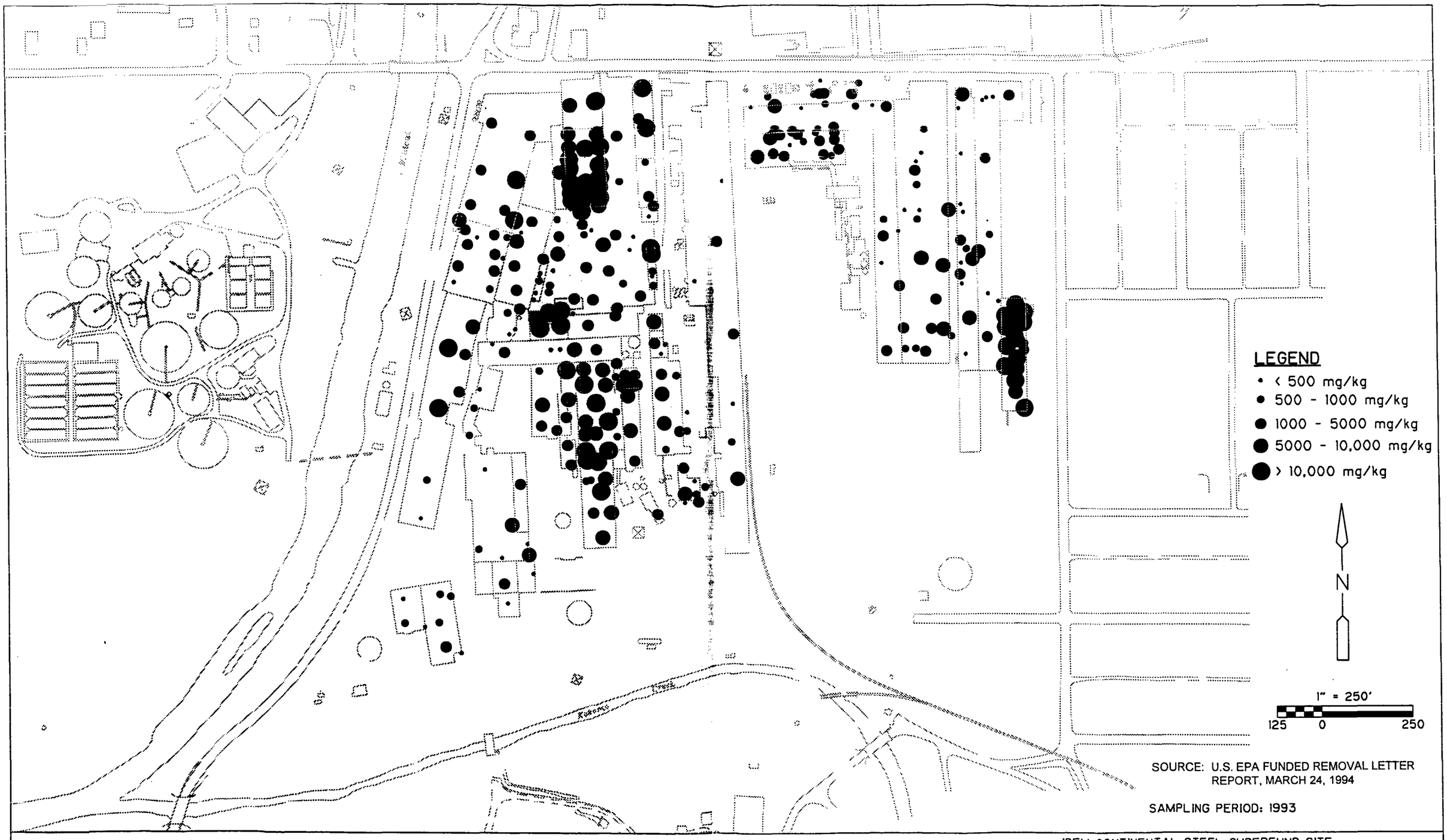
IDEM CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
MAIN PLANT

INSIDE BUILDING CHROMIUM CONCENTRATIONS FOR SURFACE SOILS

Date: November 28, 1995 Figure 1



SOURCE: U.S. EPA FUNDED REMOVAL LETTER REPORT, MARCH 24, 1994

SAMPLING PERIOD: 1993

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IDEM CONTINENTAL STEEL SUPERFUND SITE
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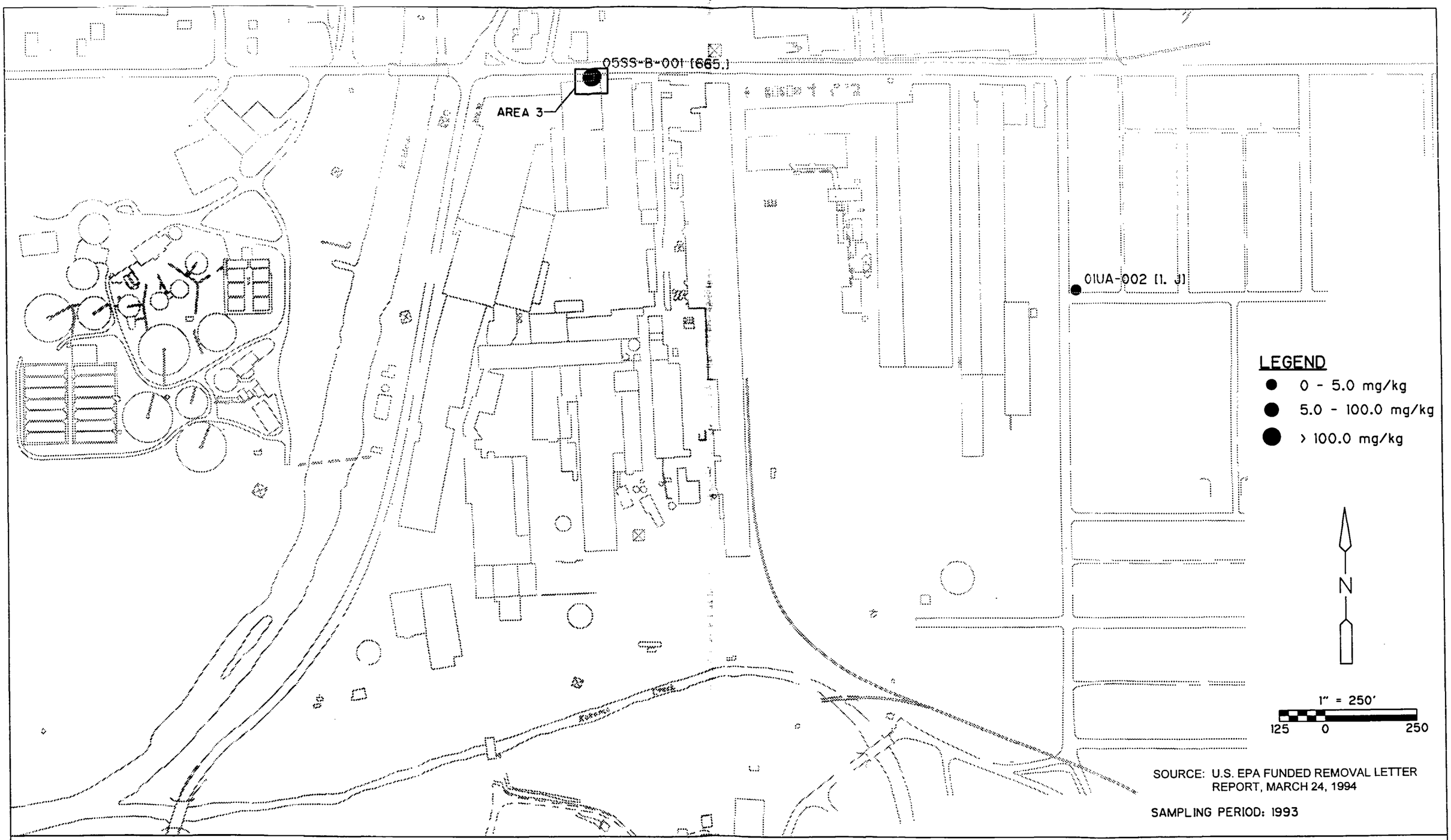
MAIN PLANT

INSIDE BUILDING LEAD CONCENTRATIONS FOR SURFACE SOILS

Date: November 28, 1995 Figure 2



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IDEM CONTINENTAL STEEL SUPERFUND SITE
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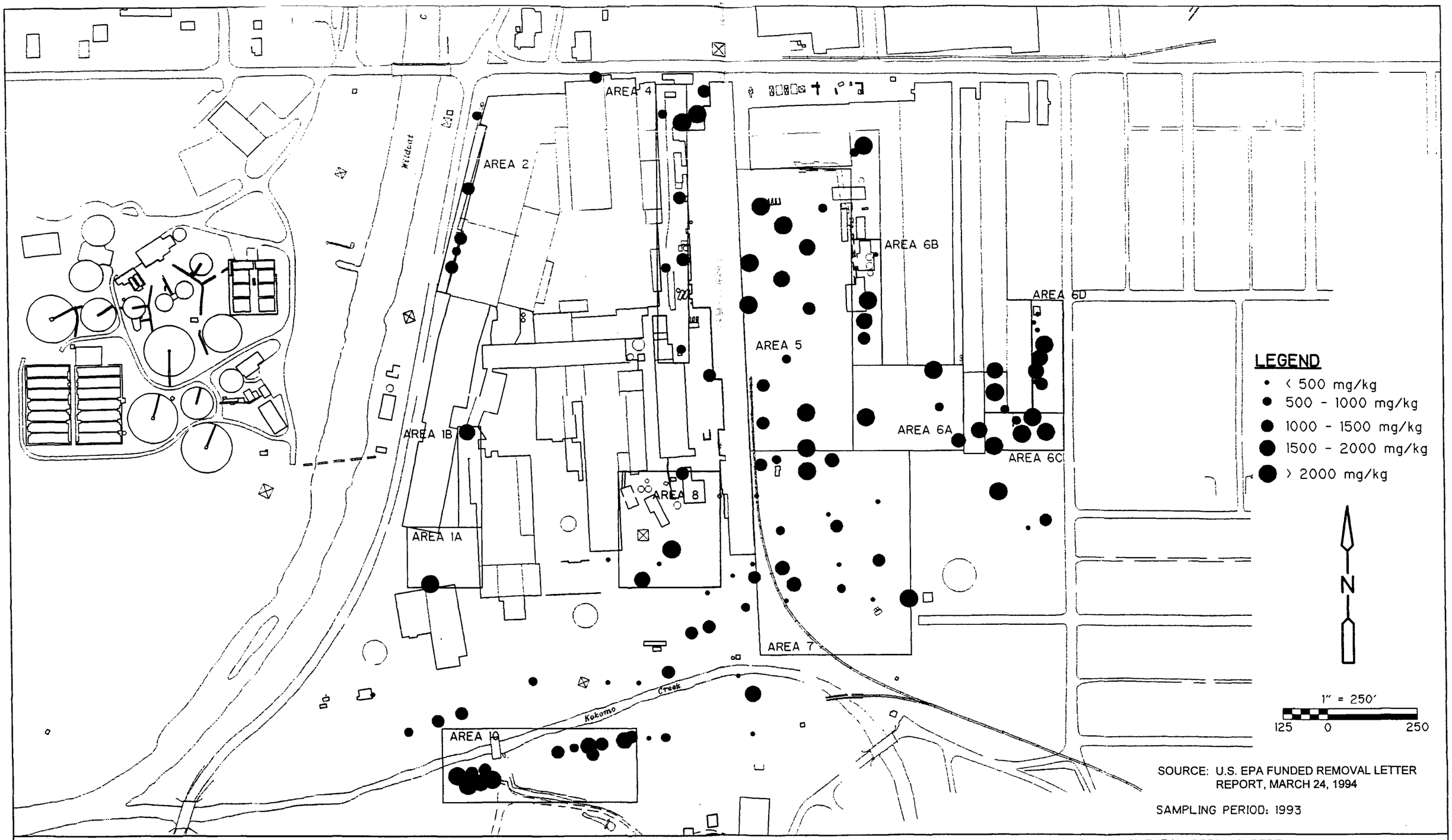
OUTSIDE BUILDING CADMIUM CONCENTRATIONS FOR SURFACE SOILS

Date: November 28, 1995 Figure 3



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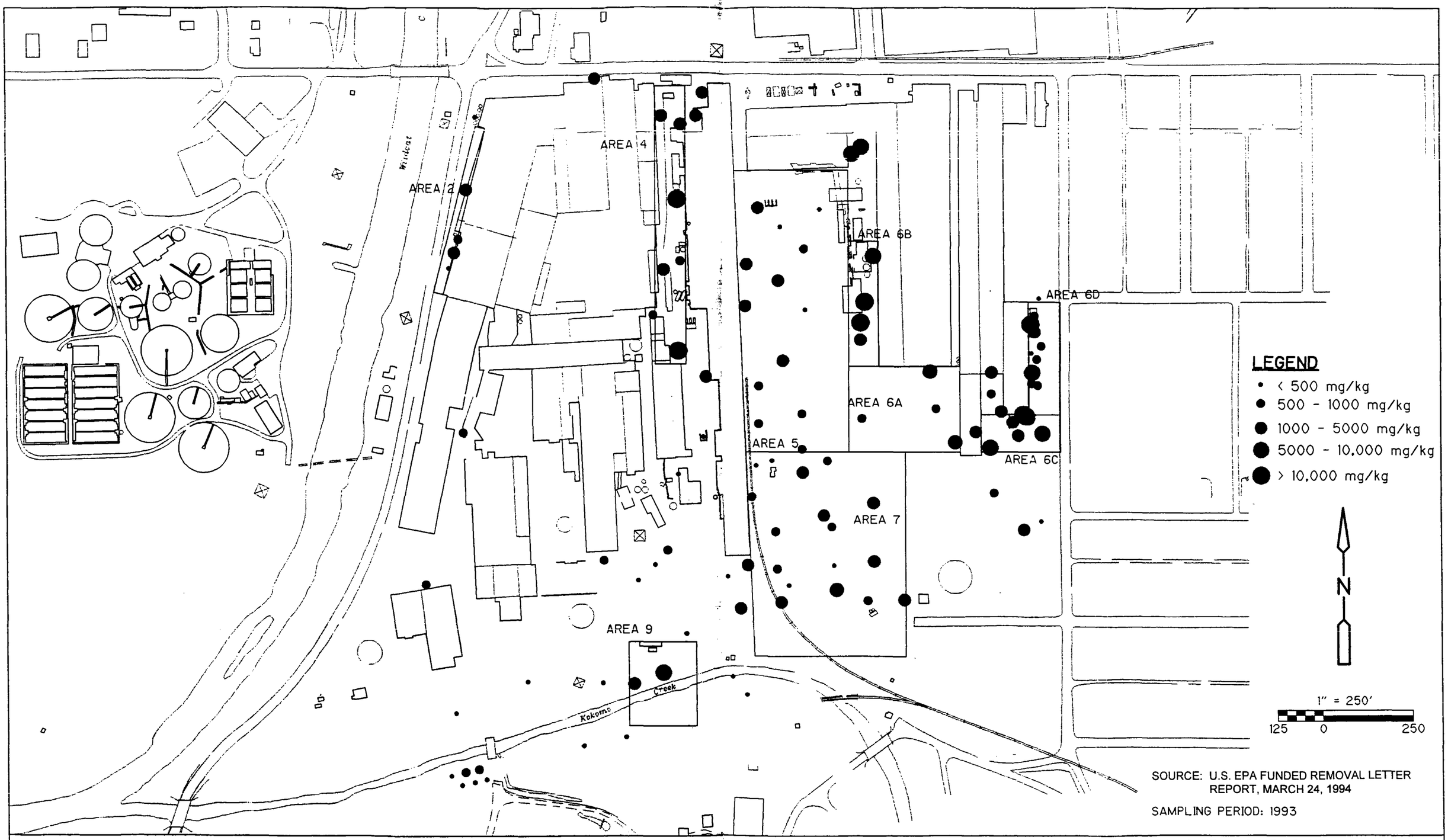
IDEM CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
MAIN PLANT

OUTSIDE BUILDING CHROMIUM CONCENTRATION DOT PLOT FOR SURFACE SOILS

Date: November 28, 1995 Figure 4



SOURCE: U.S. EPA FUNDED REMOVAL LETTER REPORT, MARCH 24, 1994

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IDEM CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
MAIN PLANT

OUTSIDE BUILDING LEAD CONCENTRATION DOT PLOT FOR SURFACE SOILS

Date: November 28, 1995 Figure 5

Based on the above assumptions, the total suspended particulate emission factor is estimated at 13 kg/day/hectare or 1.51×10^{-8} kg/s/m^2. This emission factor is used for both inside and outside the buildings.

1.1.3 Estimated Emission Factors for Chemicals of Concern

Cadmium, chromium and lead are assumed to become airborne with the suspended particulate. Emission factors of the chemicals of concern are calculated from the total suspended particulate emission factor and the estimated soil concentrations for each area, as follows:

$$E_c=(E_s)\ (C_c)\ /\ 1000$$

where

E_c = chemical of concern emission factor (g/s/m^2)
E_s = total suspended particulate emission factor (kg/s/m^2)
C_c = estimated soil concentration of constituent (mg/kg)

1.1.3.1 Building Sources

The on-site buildings at the CSSS Main Plant are in various stages of deterioration. Openings in the building determine the flow of air inside the buildings as well as the location of the emission points. As specified by the dispersion model, on-site buildings are modeled as volume sources where the volume is assumed to be emitting evenly from all sides. Since the chemicals of concern are assumed to emit from the areas of the building open to the atmosphere, the emission factor is multiplied by the open fraction of the building. Completely closed buildings were not included in the analysis.

The CDM field team performed on-site building inspections and measured the sizes of the openings in many of the buildings. The open fraction of each modeled building was estimated based on the field notes and photographs taken during the building inspections.

Table 1 provides the dimensions, estimated soil concentration, estimated percent of the building open to the atmosphere and emission estimate for each building modeled.

1.1.3.2 Area Sources

Because the vegetation of the on-site area sources limits the amount of soil that is available for wind erosion, the emission factor is multiplied by the non-vegetated fraction of the area. **Table 2** provides the dimensions, estimated soil concentration, estimated percent vegetated, and emission estimates for each area modeled.

TABLE 1
MAIN PLANT BUILDING SOURCES
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Building No.	Footprint (m^2)	Length (m)	Volume (m^3)	Southwest Corner		Soil Concentration		Percent Open	Emission Rate	
				X-Coord. (m)	Y-Coord. (m)	Lead (mg/kg)	Chromium (mg/kg)		Lead (g/s)	Chromium (g/s)
123A	949	30.8	4,916	-264	-220	750	750	3%	3.13E-07	3.13E-07
123	1,759	41.9	9,114	-234	-247	3,000	1,750	2%	1.70E-06	9.93E-07
110	6,162	78.5	93,916	-197	-186	7,500	1,750	10%	6.92E-05	1.62E-05
112C	2,812	53.0	25,717	-262	-125	750	750	2%	7.63E-07	7.63E-07
112A	3,585	59.9	32,778	-245	-36	10,000	1,750	4%	2.07E-05	3.62E-06
112	2,810	53.0	25,691	-223	73	3,000	1,750	2%	2.20E-06	1.28E-06
112B	6,187	78.7	56,572	-212	136	10,000	1,750	0%	0.00E+00	0.00E+00
113	687	26.2	14,666	-202	-25	750	750	9%	6.95E-07	6.95E-07
14	2,575	50.7	31,389	-180	65	7,500	750	22%	6.41E-05	6.41E-06
8,10,122	11,055	105.1	134,786	-151	55	7,500	1,750	40%	5.01E-04	1.17E-04
117	765	27.7	9,331	-128	143	7,500	375	13%	1.08E-05	5.42E-07
11	2,214	47.1	26,990	-117	143	10,000	2,500	13%	4.18E-05	1.04E-05
12	1,473	38.4	13,466	-120	211	10,000	1,750	15%	3.36E-05	5.87E-06
19	2,301	48.0	42,086	-193	9	7,500	1,750	25%	6.51E-05	1.52E-05
20	1,492	38.6	18,193	-149	-51	7,500	1,750	6%	1.00E-05	2.33E-06
21	515	22.7	4,713	-148	-52	10,000	375	0%	0.00E+00	0.00E+00
22	283	16.8	1,034	-125	-51	3,000	1,750	0%	0.00E+00	0.00E+00
23	368	19.2	2,806	-124	-79	3,000	750	0%	0.00E+00	0.00E+00
24	5,032	70.9	92,034	-105	-147	10,000	1,750	2%	1.71E-05	3.00E-06
4	1,041	32.3	19,041	-70	-81	750	375	8%	8.91E-07	4.45E-07
25	370	19.2	2,819	-79	-11	7,500	1,750	57%	2.39E-05	5.58E-06
115	784	28.0	4,781	-149	31	10,000	2,500	22%	2.60E-05	6.51E-06
9A	231	15.2	2,114	-128	57	3,000		22%	2.30E-06	0.00E+00
9	768	27.7	7,027	-118	32	3,000	375	22%	7.66E-06	9.57E-07
114	592	24.3	5,416	-80	34	3,000	375	31%	8.33E-06	1.04E-06
27	228	15.1	1,041	-50	-123	3,000	750	22%	2.27E-06	5.67E-07
29	200	14.1	1,521	-18	-106	7,500	1,750	52%	1.17E-05	2.73E-06
1	2,025	45.0	30,861	-45	-67	7,500	1,750	3%	7.17E-06	1.67E-06
2	238	15.4	4,714	-49	16	3,000	375	0%	0.00E+00	0.00E+00
30	69	8.3	629	-49	33			25%	0.00E+00	0.00E+00
31	166	12.9	1,515	-50	39	7,500		22%	4.13E-06	0.00E+00
34	249	15.8	2,278	-50	74	10,000	2,500	39%	1.48E-05	3.69E-06
37A	166	12.9	1,516	-56	132	500	750	22%	2.75E-07	4.13E-07
37	661	25.7	6,047	-58	144	3,000	750	34%	1.03E-05	2.57E-06
38	419	20.5	4,469	-60	185	10,000	750	22%	1.39E-05	1.04E-06
39	696	26.4	5,305	-62	211	10,000	375	22%	2.31E-05	8.67E-07
40	3,473	58.9	79,384	14	-150	7,500	1,750	2%	6.78E-06	1.58E-06
42	1,791	42.3	38,203	0	0	3,000	2,500	7%	5.95E-06	4.95E-06
5	8,322	91.2	190,240	-17	61	3,000	2,500	50%	1.89E-04	1.57E-04
54	251	15.8	2,294	-9	252			0%	0.00E+00	0.00E+00
125	2,633	51.3	64,207	34	207	7,500	2,500	10%	2.98E-05	9.94E-06
68	4,339	65.9	92,584	144	11	3,000	1,750	95%	1.87E-04	1.09E-04
69	9,868	99.3	210,537	165	11	7,500	1,750	10%	1.12E-04	2.61E-05
70A	1,145	33.8	13,955	212	-62			5%	0.00E+00	0.00E+00
70	3,893	62.4	47,466	212	5	7,500	1,750	37%	1.62E-04	3.77E-05
71	5,011	70.8	61,094	229	5	3,000	750	21%	4.74E-05	1.18E-05
71B	2,009	44.8	30,619	248	-29	10,000	2,500	3%	7.73E-06	1.93E-06
71A	648	25.5	7,899	249	219	3,000		0%	0.00E+00	0.00E+00
14D	1,084	32.9	24,774	-186	29	3,000	2,500	22%	1.08E-05	9.00E-06

TABLE 2
MAIN PLANT AREA SOURCES
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Area No.	Area (m^2)	Height (m)	X-Coord. (m)	Y-Coord. (m)	Soil Concentration			Percent Vegetated	Emission Rate		
					Lead (mg/kg)	Chromium (mg/kg)	Cadmium (mg/kg)		Lead ($g/s-m^2$)	Chromium ($g/s-m^2$)	Cadmium ($g/s-m^2$)
1a	2,806	0	-256	-180		2,000		50%		1.51E-08	
1b	2,052	0	-222	-131		1,750		50%		1.32E-08	
2	1,821	0	-238	75	3,000	1,250		50%	2.26E-08	9.44E-09	
3	929	0	-114	232			665	50%			5.02E-09
4	5,073	0	-37	17	10,000	2,000		20%	1.21E-07	2.42E-08	
5	22,092	0	37	-70	3,000	2,000		40%	2.72E-08	1.81E-08	
6a	7,462	0	122	-70	10,000	2,000		80%	3.02E-08	6.04E-09	
6b	2,352	0	122	12	10,000	2,000		80%	3.02E-08	6.04E-09	
6c	2,074	0	235	-70	10,000	2,000		80%	3.02E-08	6.04E-09	
6d	2,121	0	274	-37	10,000	2,000		80%	3.02E-08	6.04E-09	
7	18,581	0	37	-226	3,000	2,000		80%	9.06E-09	6.04E-09	
8	8,584	0	-76	-181		2,000		90%		3.02E-09	
9	4,413	0	-73	-293	7,500			50%	5.66E-08		
10	7,730	0	-226	-346		2,000		50%		1.51E-08	

1.1.3.3 Comparison of Emission Estimates to Indoor Air Monitoring Data

CDM collected indoor air samples in Main Plant buildings with Alpha-1 personal air samplers and MIE Miniram dust monitors. On November 21, 1995, the samplers were set up in six Main Plant buildings. Alpha-1 samplers were placed in Buildings 112B, 11, 42 and 68. Two Alpha-1 samplers were co-located in Building 11 for quality assurance/quality control purposes. MIE Minirams were placed in Buildings 112B, 42, 24 and 70. In Buildings 112B and 42, Minirams were co-located with Alpha-1 samplers. Buildings 112B, 11, 68 and 70 had previously undergone U.S. EPA decontamination; Buildings 24 and 42 had not been decontaminated.

A mini-Buck Calibrator®, which utilizes a soap-film bubble test, was used to measure the flow rate on the Alpha-1 samplers. The Alpha-1 sampler operates by drawing a pre-calibrated, low-flow rate of atmosphere through tygon tubing attached to a filter cassette containing a 37 millimeter, 0.8 micrometer cellulose ester filter. The pre-determined rate of flow for these samples was set at approximately two liters per minute (lpm). All samplers ran for at least 4.5 hours between the hours of 12:00 p.m. and 5:00 p.m.. After the sampling period was completed, the filters were collected and submitted to Kemron Environmental Services Laboratory. The Alpha-1 samplers were then re-calibrated, and an average of the pre- and post-calibrations was used to calculate the total volume of air sampled.

The Miniram, a direct reading instrument, passively detects respirable particles in the air and reports their concentration in milligrams per cubic meter (mg/m^3). The Miniram displays a reading every 15 seconds, and stores these data for up to 8-hours.

During the time that the air samplers were running, no activity was taking place in the buildings that would have created excess dust. Sample locations, flow rates, run times, and other recorded information are summarized in **Table 3.**

Results of the Alpha-1 sample analyses show that none of the samples were above the detection limit of 0.05 milligrams total particulate measured on the filter, which is approximately 0.08 mg/m^3. The Miniram results showed measurable particulate levels in Buildings 112B and 24. However, because Building 112B is not open to the atmosphere, the building was not used for the modeling analysis. Building 24, where the Miniram detected a 4.5-hour time weighted average concentration (TWA) of 0.01 mg/m^3 respirable particulate, is used as an example to compare the estimated emissions with the air monitoring data.

TABLE 3
INDOOR AIR SAMPLING RESULTS
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Building Number	Sampler Type	Total Sample Run Time (minutes)	Average Flow Rate [1] (l/min)	Total Volume (liters)	Time Weighted Average [2] (mg/m^3)
112B	Alpha-1	296	2.047	606.66	ND
112B	Miniram	294			0.11
11	Alpha-1	292	2.029	592.61	ND
11	Alpha-1	294	2.08	610.34	ND
24	Miniram	272			0.01
42	Alpha-1	288	1.999	575.71	ND
42	Miniram	282			ND
68	Alpha-1	278	1.92	533.76	ND
70	Miniram	274			ND

ND = Not detected

(1) The sample flow rate for the Alpha-1 sampler was calculated by averaging three calibration flow rates with a Mini-buck calibrator. The Miniram operates passively.

(2) The Miniram stores the readings it displays every 15 seconds. A time weighted average is automatically calculated after a given sample run. The Alpha-1 samplers also provide a time weighted average for the sample.

A simple mass balance can be applied where the rate of increase of pollutant concentration in the building equals the rate of pollution entering the building less the rate of pollution leaving the building. The mass balance assumes well-mixed conditions inside the building and all the volume of the building is exchanged per air change.

$$V\,dC/dt = S + C_aIV - CIV$$

where

V = volume of building (m^3)
I = air exchange rate (air changes per hour)
S = pollutant source strength (mg/h)
C = indoor concentration (mg/m^3)
C_a = ambient concentration (mg/m^3)

Assuming the ambient concentration of the pollutant is negligible, the steady-state solution ($dC/dt = 0$) to the equation is:

$$S = CIV$$

Assuming six air changes per hour and a volume of 92,000 m^3, the pollutant source strength is calculated as 5.52 mg/h or 1.53×10^{-6} grams per second (g/s), where the estimated emission rate of total particulate for Building 24 is 7.6×10^{-2} g/s. Although the Miniram measures particles ranging in size from 0.1 to 10 micrometers, the estimated emission rate of total particulate is conservative based on a comparison with measured data.

2 Air Dispersion Modeling

The U.S. EPA Industrial Source Complex Short Term (ISCST3) dispersion model, version 95250, was used to predict 8-hour, 24-hour and annual maximum concentrations at fence line and off-site receptors. ISCST3 is a Gaussian air quality dispersion model which predicts pollutant concentrations at specified receptor points. Inputs to the ISCST3 model include volume and area source characteristics, as described above, hourly meteorological data and ISCST3 modeling options.

2.1 Receptor Locations

Receptor locations include 405 off-site receptors and 113 fence line receptors. Off-site receptors are within a 1-kilometer grid centered at the southwest corner of Building 42, with receptor locations spaced every 100 meters. These receptors do not correspond to actual homes or to the residential soil sample locations discussed in Section 4.4.1.5.8. Fence line receptors are spaced every 50 meters. These receptors are assumed to be on the same elevation as the area and volume sources.

In addition, three discrete receptors are included in the analysis to represent the locations of the high-volume particulate samplers. Two high-volume particulate samplers were placed in downwind locations and one sampler was placed upwind (based on prevailing wind direction) of the CSSS Main Plant. One downwind sampler was located at a residential property owned by Gerald and Stephanie Love, approximately due east of the CSSS. Sampler locations are shown on **Figure 6**. Since the Love's backyard was secured by an 8-foot fence, the sampler was placed directly on the ground in an area that was relatively free of obstructions such as trees or buildings. The roof of the Moore Drugs building, located northeast of the CSSS at the intersection of Markland Avenue and Courtland Avenue, was the site of the other downwind sampler. The upwind sampler was placed on the roof of the Kokomo Wastewater Treatment Plant (WWTP) administration building, which is located west of the CSSS. Samplers were placed on roofs of buildings to prevent sample tampering or acts of vandalism. The receptor representing the sampler on the Love property is modeled at an elevation of 1 meter for the height of the sampler; the receptors representing the samplers on the WWTP administration building roof and the Moore Drugs building roof are modeled at an elevation of 5 meters. This difference in elevation of the samplers had no noticeable affect on the sampling results. The results for the Love property (1 meter elevation) and Moore Drugs (5 meter elevation), both downwind of the Main Plant, showed results on the same order of magnitude.

2.2 Meteorology

One year of hourly surface meteorological data from Indianapolis, Indiana and upper air meteorological data from Dayton, Ohio were used to model air impacts from the CSSS Main Plant. Indianapolis represents the closest station to the CSSS Main Plant for which hourly surface meteorological data is available; Dayton represents the closest station for which hourly upper-air meteorological data is available. Because 1991 is the most recent upper air meteorological data available from Dayton, the 1991 surface and upper air meteorological data was used for the air impact analysis.

2.3 Modeling Options

The modeling options govern the running of the model and define the form of the output. Regulatory default modeling options were used in the analysis. Because dispersion from volume and area sources are not affected by terrain, no terrain elevations are used in the analysis. Based on 1990 census population data, the area within a 3-kilometer radius of the CSSS Main Plant is classified as urban in accordance with the U.S. EPA Guideline on Air Quality Models (August 1995). Therefore, urban dispersion coefficients, vertical potential temperature gradients and wind profile exponents are used.

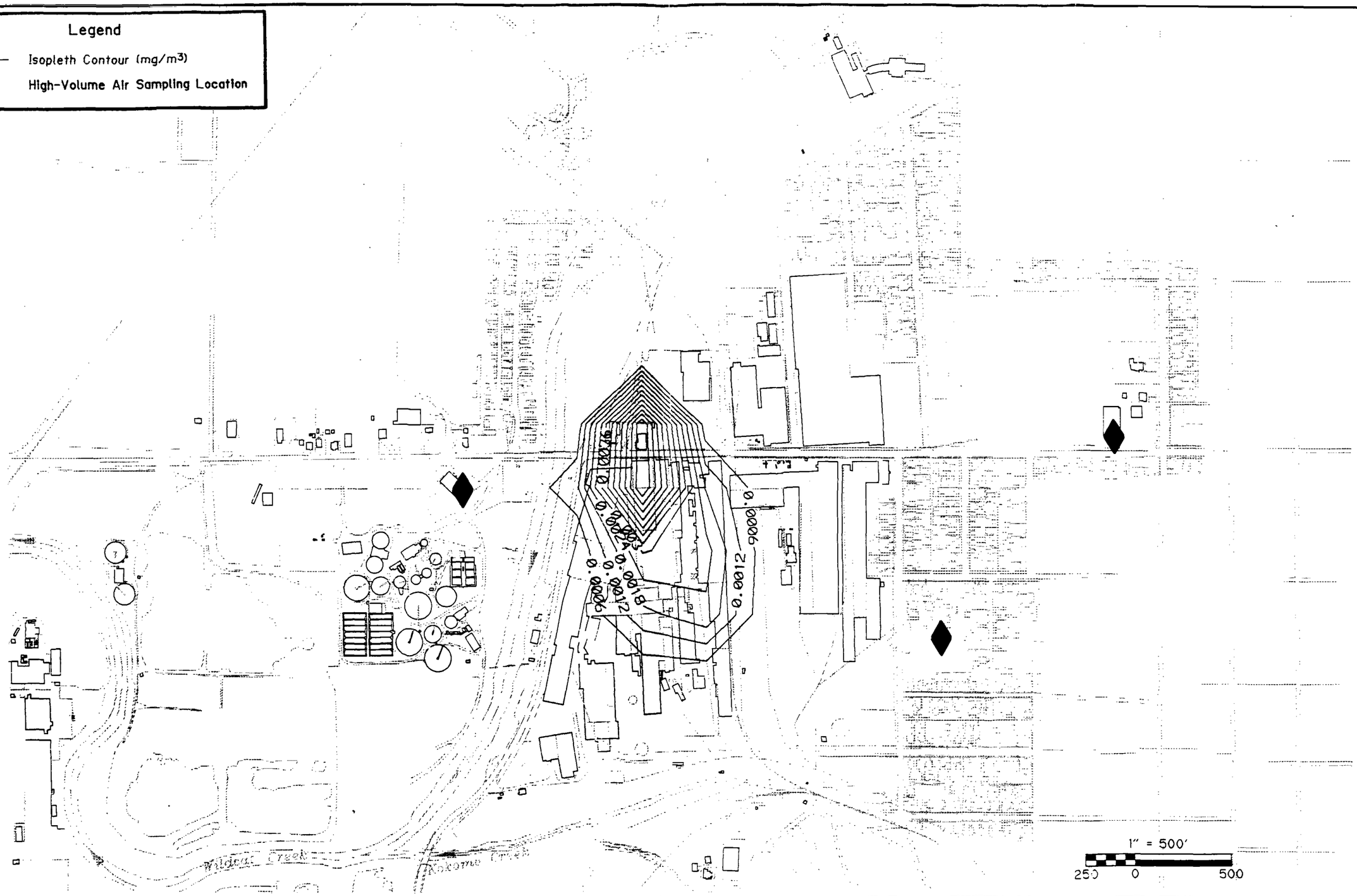
2.4 ISCST3 Modeling Assumptions

As discussed above, the ISCST3 model is a Gaussian dispersion model. Gaussian dispersion models depend on several assumptions, including ideal Gaussian distribution of the pollutants; constant meteorological conditions from sources to receptors, conservation of mass in the plume with

Legend

—0.01— Isopleth Contour (mg/m3)

High-Volume Air Sampling Location



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CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
REMEDIAL INVESTIGATION
HIGH-VOLUME AIR SAMPLING LOCATIONS AND PREDICTED ANNUAL CADMIUM IMPACTS USING ISCST3 MODEL Figure 6

complete reflection of pollutants reaching the ground and no absorption by vegetation or bodies of water, and conversion of concentrations for different averaging times using a general empirical relationship. According to Beychok (1996), who recently performed a sensitivity analysis for Gaussian dispersion models, Gaussian dispersion models may predict real-world plume concentrations within a factor of 10.

The air impact analysis also includes several assumptions specific to the CSSS Main Plant application. The following assumptions may further increase the error in the predicted impacts using the ISCST3 Gaussian dispersion model:

- The air impact analysis does not account for other sources in the area;
- The chemicals of concern are assumed to behave as gases;
- Wet and dry deposition are not included in the analysis;
- The terrain is assumed to be uniform and flat;
- Meteorology for 1991 is assumed to represent past and current conditions.

2.5 Predicted Impacts

Table 4 presents the results of the ISCST3 dispersion modeling performed for the CSSS Main Plant. The results show maximum predicted impacts for averaging times of 8-hours, 24 hours and 365 days. All maximum impacts occur at the fence line of the Main Plant property.

2.6 High-Volume Particulate Monitoring Program

In November 1995, three high-volume particulate samplers were used to measure 24-hour ambient particulate concentrations. Two samplers were placed downwind of the CSSS Main Plant and one was placed upwind, based on the prevailing wind direction coming from the southeast. High-volume sample locations were selected based on prevailing wind direction in areas with minimal obstructions and low threat of tampering and vandalism. The 24-hour modeled impacts are compared to the high-volume sampling results.

2.6.1 Equipment and Procedure

The high-volume samplers consist of an aluminum shelter (15-inch by 15-inch by 42-inch) with a triangular hood. The shelter houses a high-volume sampler, seamless stainless steel filter holder, pressure transducer, timer, and 90-volt protective transformer. The sampler is a heavy duty turbine type blower with a high speed motor arranged with a fixed orifice on the discharge end. The filter and the filter cartridge are located under the triangular hood on top of the sampler. Air flow is measured accurately by the pressure transducer. High-volume air samplers operate by drawing a large volume of atmosphere, approximately 65,000 ft^3, by means of the high flow rate blower operating at approximately 45 ft^3/min. Air was drawn into the covered housing and through the filter by means of a high flow-rate blower, so that particulate material collected on the filter surface. The analysis of particulate matter for metals required that all quartz fiber filters have a low metals content.

TABLE 4
MAXIMUM PREDICTED IMPACTS USING ISCST3 MODEL
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Chemical of Concern	8-Hour Impact ($\mu g/m^3$)	24-Hour Impact ($\mu g/m^3$)	Annual Impact ($\mu g/m^3$)
Cadmium	0.07	0.05	0.02
Chromium	0.34	0.20	0.08
Lead	0.78	0.46	0.18

Note: All maximum predicted impacts occurred at the CSSS Main Plant fence line.

Sample air volumes were determined by means of a Dickson flow-rate indicator. The Dickson flow-rate indicator was calibrated against a master flowmeter (Rootsmeter). Sampler calibrations were performed before air sampling was initiated and at the termination of the air sampling. Orifice-type flow indicators are sensitive to changes in both temperature and barometric pressure. The average barometric pressure and seasonal average temperature for the Kokomo area were incorporated into the sampler calibration equation to provide a general correction for the variability. The average temperature of 40.6°F for the month of November for Kokomo (based on 30-year average temperatures) was obtained from the Midwest Climate Center. An estimated average barometric pressure was factored into the calibration equation by reducing the sea-level pressure of 760 millimeters of mercury (mmHg) by 26 mm Hg for each 1000 feet of elevation above sea level.

The fugitive dust samples were collected over a 24-hour period. A timer on the high-volume sampler was generally set to run the samples from midnight to midnight. Samples collected early in the investigation were initiated when the filter was placed in the samplers (usually around 9:00 am), then retrieved the following day. The samplers were operated on a three-day cycle (one day of sampling followed by two days without sampling). Samples were retrieved from the filter cartridge by CDM personnel wearing nitrile gloves. The filter papers were folded in half length-wise, sample side in, and placed in a paper folder for shipment to the laboratory. The samplers' elapsed time readings and the air flow rates were recorded onto a Hi-Vol Sampler Data Record, along with sample information such as the location, date, and filter number.

2.6.2 High-Volume Sampling Results

Table 5 provides the results of the high-volume particulate sampling. The filters were analyzed for cadmium, chromium, lead and total particulates. Because many of the filters contained metal levels below the detection limit, the filters were analyzed a second time using a lower detection limit. The results of the second round of analysis are included in **Table 6**.

2.6.3 Comparison of Modeled Impacts with Measured Concentrations

Table 7 presents a comparison of the impacts predicted by the dispersion model and the measured concentrations. The predicted impacts are the maximum predicted 24-hour concentrations for the three receptors that represent the locations of the samplers as shown on **Figure 6**. The predicted impacts represent conservative estimates of impacts from the CSSS Main Plant. The measured concentrations are the maximum results from 10 rounds of 24-hour samples collected in November 1995 using the high-volume particulate samplers. The measured concentrations include contributions from all sources of the chemicals of concern.

Table 7 suggests that sources of cadmium, chromium and lead other than the CSSS Main Plant most likely exist. Since the emissions estimating and dispersion modeling include many conservative assumptions, one would expect the predicted impacts from the CSSS Main Plant to be much higher than the measured concentrations if other sources did not exist. However, for chromium and lead, the predicted impacts are within a factor of 10 of the measured concentrations, and the predicted impacts of cadmium are well below the measured concentrations. The predicted impacts of

TABLE 5

Camp Dresser & McKee
CDM: Environmental Data Manager
Version 3.03.00

SUMMARY OF DETECTIONS/HIGH VOLUME AIR SAMPLING
CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

LOCATION ID ===>		05AI-001	05AI-002	05AI-003	05AI-005	05AI-006	05AI-007	05AI-009
SAMPLE ID ===>		05AI00100006XX	05AI00200006XX	05AI00300006XX	05AI00500006XX	05AI00600006XX	05AI00700006XX	05AI00900006XX
SAMPLE DATE ===>		11/01/95	11/01/95	11/01/95	11/04/95	11/04/95	11/04/95	11/07/95
TEXT 001 ===>		AI-01	AI-02	AI-03	AI-05	AI-06	AI-07	AI-09
GROUP: AIROUT								
CADMIUM	ug/m3	0.0064	-----	-----	-----	-----	-----	-----
CHROMIUM	ug/m3	-----	-----	-----	-----	-----	-----	-----
LEAD	ug/m3	-----	-----	-----	-----	-----	-----	-----
Total Suspended Part	mg/m3	0.032	0.04	0.026	0.016	0.018	0.015	0.028

TABLE 5

Camp Dresser & McKee
CDM:Environmental Data Manager
Version 3.03.00

SUMMARY OF DETECTIONS/HIGH VOLUME AIR SAMPLING
CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

LOCATION ID ===>		05AI-010	05AI-011	05AI-013	05AI-014	05AI-015	05AI-017	05AI-018
SAMPLE ID ===>		05AI01000006XX	05AI01100006XX	05AI01300006XX	05AI01400006XX	05AI01500006XX	05AI01700006XX	05AI01800006XX
SAMPLE DATE ===>		11/07/95	11/07/95	11/15/95	11/15/95	11/15/95	11/17/95	11/17/95
TEXT 001 ===>		AI-10	AI-11	AI-13	AI-14	AI-15	AI-17	AI-18
GROUP: AIROUT								
CADMIUM	ug/m3	-----	-----	-----	-----	-----	-----	0.0086
CHROMIUM	ug/m3	-----	-----	-----	-----	-----	-----	-----
LEAD	ug/m3	-----	-----	-----	-----	-----	-----	-----
Total Suspended Part.	mg/m3	0.032	0.026	0.027	0.033	0.031	0.031	0.036

TABLE 5

Camp Dresser & McKee
CDM:Environmental Data Manager
Version 3.03.00

SUMMARY OF DETECTIONS/HIGH VOLUME AIR SAMPLING
CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

LOCATION ID ===>		05AI-019	05AI-021	05AI-022	05AI-023	05AI-025	05AI-026	05AI-027
SAMPLE ID ===>		05AI01900006XX	05AI02100006XX	05AI02200006XX	05AI02300006XX	05AI02500006XX	05AI02600006XX	05AI02700006XX
SAMPLE DATE ===>		11/17/95	11/20/95	11/20/95	11/20/95	11/27/95	11/27/95	11/27/95
TEXT 001 ===>		AI-19	AI-21	AI-22	AI-23	AI-25	AI-26	AI-27
GROUP AIROUT								
CADMIUM	ug/m3	-----	-----	-----	-----	0.0038	-----	-----
CHROMIUM	ug/m3	-----	-----	-----	0.034	-----	-----	-----
LEAD	ug/m3	-----	-----	-----	-----	-----	-----	-----
Total Suspended Part	mg/m3	0.022	0.038	0.041	0.041	0.043	0.047	0.048

TABLE 5

Camp Dresser & McKee
CDM:Environmental Data Manager
Version 3.03.00

SUMMARY OF DETECTIONS/HIGH VOLUME AIR SAMPLING
CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

LOCATION ID ===>		05AI-029	05AI-030	05AI-031	05AI-033	05AI-034	05AI-035	05AI-037
SAMPLE ID ===>		05AI02900006XX	05AI03000006XX	05AI03100006XX	05AI03300006XX	05AI03400006XX	05AI03500006XX	05AI03700006XX
SAMPLE DATE ===>		11/30/95	11/30/95	11/30/95	12/05/95	12/05/95	12/05/95	12/08/95
TEXT 001 ===>		AI-29	AI-30	AI-31	AI-33	AI-34	AI-35	AI-37
GROUP: AIROUT								
CADMIUM	ug/m3	-----	-----	-----	-----	-----	-----	0.0036
CHROMIUM	ug/m3	-----	-----	-----	-----	-----	-----	0.042
LEAD	ug/m3	-----	-----	-----	-----	0.044	-----	-----
Total Suspended Part	mg/m3	0.032	0.048	0.056	0.037	0.03	0.056	0.062

TABLE 5

Camp Dresser & McKee
CDM:Environmental Data Manager
Version 3.03.00

SUMMARY OF DETECTIONS/HIGH VOLUME AIR SAMPLING
CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

		LOCATION ID ===>	05AI-038	05AI-039
		SAMPLE ID ===>	05AI03800006XX	05AI03900006XX
		SAMPLE DATE ===>	12/08/95	12/08/95
		TEXT 001 ===>	AI-38	AI-39
GROUP. AIROUT				
CADMIUM	ug/m3		0.0034	0.01
CHROMIUM	ug/m3		0.029	0.024
LEAD	ug/m3		-----	-----
Total Suspended Part	mg/m3		0.052	0.063

TABLE 6

Camp Dresser & McKee
CDM:Environmental Data Manager
Version 3.03.00

SUMMARY OF DETECTIONS/HIGH VOLUME AIR SAMPLING
SECOND ROUND OF ANALYSIS AT LOWER DETECTION LIMITS
CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

	LOCATION ID ===>		05AI-005	05AI-006	05AI-007	05AI-017	05AI-018	05AI-021	05AI-022
	SAMPLE ID ===>		05AI00500006XX	05AI00600006XX	05AI00700006XX	05AI01700006XX	05AI01800006XX	05AI02100006XX	05AI02200006XX
	SAMPLE DATE ===>		11/04/95	11/04/95	11/04/95	11/17/95	11/17/95	11/20/95	11/20/95
	TEXT 001 ===>		AI-05	AI-06	AI-07	AI-17	AI-18	AI-21	AI-22
GROUP: AIROUT									
CALMIUM	ug/m3		0.0003	0.0002	0.0001	0.0030	0.0089	0.0006	0.0004
CHROMIUM	ug/m3		0.0059	0.0041	0.0140	0.0022	0.0020	0.0130	0.0110
LEAD	ug/m3		0.0040	0.0040	0.0040	0.0130	0.0080	0.0100	0.0080

TABLE 7
COMPARISON OF MAXIMUM 24-HOUR PREDICTED IMPACTS TO MEASURED CONCENTRATIONS
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Location of Receptor	Cadmium		Chromium		Lead	
	Measured Concentration ($\mu g/m^3$)	Predicted Impact ($\mu g/m^3$)	Measured Concentration ($\mu g/m^3$)	Predicted Impact ($\mu g/m^3$)	Measured Concentration ($\mu g/m^3$)	Predicted Impact ($\mu g/m^3$)
WWTP	0.01	0.00011	0.033	0.017	0.004	0.049
Moore Drug	0.0086	0.00002	0.029	0.015	0.008	0.034
Love Residence	0.0064	0.00007	0.042	0.028	0.013	0.086

cadmium are small because cadmium was found above the detection limit in only one on-site location. If an on-site area with a high concentration of cadmium was overlooked, this area would be too small to account for the higher measured concentrations at all three samplers, which suggest a more pervasive source or sources.

Additional evidence supports the existence of other significant sources of the chemicals of concern. The maximum measured concentrations from the high-volume particulate samplers sometimes occurred when the sampler was upwind of the CSSS Main Plant. For example, the maximum measured concentrations of lead and chromium at the Kokomo WWTP sampler, which is west of the CSSS Main Plant, occurred on November 4 and November 20, 1995 when the reported wind directions were from the northwest and southwest, respectively. Similarly, the maximum measured concentration of cadmium at the Love residence sampler, which is east of the CSSS Main Plant, occurred on November 1, 1995, when the reported wind direction was from the southeast.

Based on the information in **Tables** 4 and 7, the overall maximum predicted impacts of the chemicals of concern appear to conservatively estimate the contribution of the CSSS Main Plant to the local air quality.

2.7 Comparison to Indiana Standards

Table 8 presents a comparison of 8-hour impacts predicted by the dispersion model and the proposed Indiana air toxics standards. IDEM is proposing to use Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) as the basis for a standard to compare to ambient levels of Hazardous Air Pollutants (HAPs). PELs are time weighted concentrations not to be exceeded during an 8-hour work shift of a 40-hour week. IDEM is proposing to use a safety factor of 200 with the PELs. The proposed air toxics standards for cadmium, chromium and lead are 1 $\mu g/m^3$, 2.5 $\mu g/m^3$ and 0.25 $\mu g/m^3$, respectively. **Table 8** shows that the 8-hour predicted impacts are below the proposed Indiana air toxics standards for cadmium and chromium but above the proposed Indiana air toxics standard for lead.

2.8 Comparison to Residential Surface Soil Sampling

Residential surface soil samples were collected to assess the current levels of the chemicals of concern in the off-site surface soil due to past and present activity at the CSSS Main Plant. For this air impact analysis, present activity includes wind erosion from on-site soil concentrations measured during the 1995 surface soil sampling. Past activity refers to anything prior to this analysis. The air dispersion modeling results can predict qualitatively where to expect the highest ambient air concentrations of the chemicals of concern, and, by inference, the highest soil impacts associated with fugitive dust at the CSSS Main Plant. However, the air dispersion modeling cannot account for unidentified sources of the chemicals of concern that may also be present.

The modeled impacts represent annual average concentrations. Assuming that annual concentration patterns adequately reflect past and present prevailing meteorological conditions, the maximum air impacts should reflect maximum surface soil impacts associated with identified sources of contaminated fugitive dust at the CSSS Main Plant. As discussed above, 1991 surface

TABLE 8
COMPARISON OF MAXIMUM PREDICTED IMPACTS TO INDIANA STANDARDS
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Chemical of Concern	8-Hour Impact ($\mu g/m^3$)	8-Hour OSHA PEL ($\mu g/m^3$)	8-Hour Proposed Indiana Standard ($\mu g/m^3$)
Cadmium	0.07	200	1.00
Chromium	0.34	500	2.50
Lead	0.78	50	0.25

meteorological data from Indianapolis and 1991 upper air meteorological data from Dayton, Ohio was used for the air impact analysis. Because these data represent regional conditions, not local conditions, some variability can be expected in the modeling results.

Isopleth maps provide a visual representation of the modeled concentrations. Isopleth maps of the predicted annual average concentrations for cadmium, chromium and lead resulting from modeling identified sources of contaminated fugitive dust at the CSSS Main Plant are given in **Figures 6, 7** and **8**, respectively. The isopleth maps show that the maximum air impacts occur on-site and spread eastward, consistent with the direction of the prevailing wind. Similarly, results of the residential surface soil samples collected east of the Main Plant suggest that maximum residential surface soil impacts of cadmium, chromium and lead occur nearest to the Main Plant.

Legend

—0.01— Isopleth Contour (mg/m^3)

N

1" = 500'

250 0 500

CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
REMEDIAL INVESTIGATION

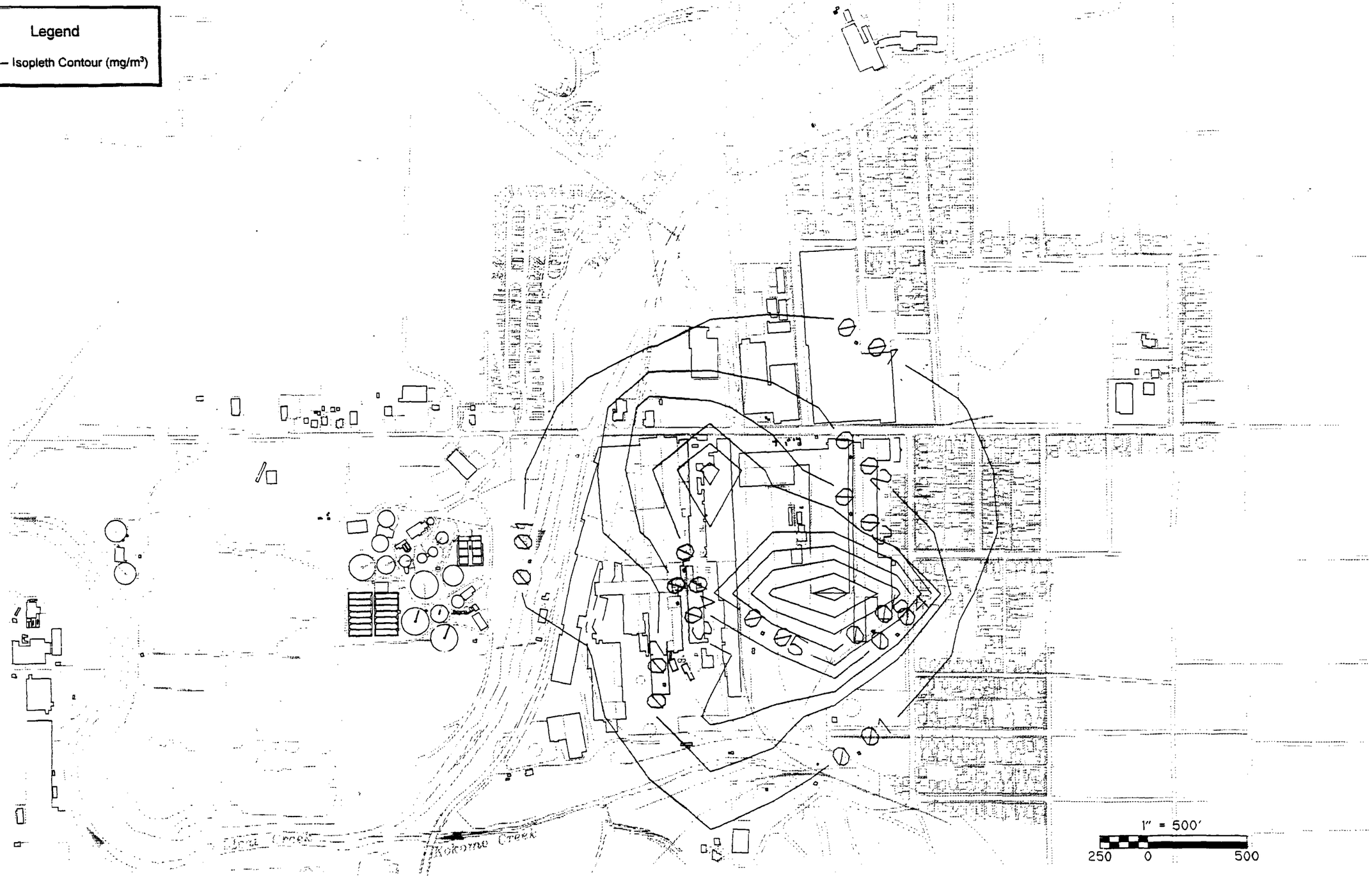
PREDICTED ANNUAL CHROMIUM IMPACTS USING ISCST3 MODEL

Figure 7

CDM
environmental engineers, scientists, planners, & management consultants

Legend

—0.01— Isopleth Contour (mg/m³)



CDM
environmental engineers, scientists,
planners, & management consultants

CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
REMEDIAL INVESTIGATION

PREDICTED ANNUAL LEAD
IMPACTS USING ISCST3 MODEL

Figure 8

2.9 References

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APPENDIX D

Main Plant Soil Boring Logs and Detailed Building Inspection Form

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-A1

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-25-95 End 10-25-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 1 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-A1S	100%	0 0	29 ppm				Black fill material (gravel), hydrocarbon like odor
								Bottom of Boring @ 1 foot.
			-5 5					
			-10 10					
			-15 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-A2

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 11-02-95 End 11-02-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 15 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
			0 / 0				OL/OH	Black top soil with plant material Fill material (gravel and slag)
GP	SB-A2S	50%		0 ppm				
			-5 / 5					
GP		30%		0 ppm			CL	Dark brown sandy silty CLAY, medium stiff, moist
			-10 / 10					
GP	SB-A2D	60%		0 ppm			CL	Dark brown silty CLAY, medium stiff (mottled), damp
							CL	With some sand at 13 ft.
			-15 / 15				SW	Gray SAND medium grained, loose, wet
								Bottom of Boring @ 15 feet.

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
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DTC - Drill Through Casing

SAMPLING TYPES:
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BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-A3

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-03-95 End 11-03-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
			0 / 0				OL/OH	Black topsoil Fill material (brick and gravel) with some clay and weathered rock
GP	SB-A3S	100%		0 ppm				
GP		20%	-5 / 5	0 ppm				
GP		20%		0 ppm			CL	Brown silty sandy CLAY with some gravel, medium stiff
GP	SB-A3D	100%	-10 / 10	0 ppm			CL	Dark brown silty CLAY, stiff, damp
								Bottom of Boring @ 12 feet.
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-B1

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-31-95 End 10-31-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 2 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-B1S	100%	0/0	0 ppm				Fill material (wood pieces, brick and gravel), damp to moist, some black staining
								Bottom of Boring @ 2 feet - Stopped at weathered bedrock.
			-5/5					
			-10/10					
			-15/15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
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DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-B2

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-31-95 End 10-31-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 8 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-B2S	90%	0 / 0	0 ppm				Black topsoil with plant material, wood pieces and fill material
GP	SB-B2S	90%		0 ppm			CL	Dark brown silty CLAY, stiff, damp to moist, black staining on grains at 3 ft.
GP	SB-B2D	90%	-5 / 5	0 ppm			CL	Dark brown silty sandy CLAY with some gravel, medium stiff, damp
GP	SB-B2D	90%		0 ppm			SC	Brown loose SAND with some clay
GP	SB-B2D	90%		0 ppm				Weathered bedrock
								Bottom of Boring @ 8 feet.
			-10 / 10					
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis Indiana 46980

GEOPROBE LOG
SB-B3

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 10-25-95 End 10-25-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 12 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-B3S		0 / 0	0 ppm			OL/OH	Black topsoil with plant material
GP				0 ppm			CL	Dark brown to gray silty CLAY with some coarse gravel and cobbles up to 2" diameter, stiff to medium stiff, damp to dry
GP				0 ppm			GW	Gray GRAVEL with some clay, some medium to coarse sand, and trace silt, damp to dry
GP	SB-B3D		-5 / 5	0 ppm			CL	*Dark brown silty CLAY with trace plant material, stiff to medium stiff, damp*
			-10 / 10					*Bottom of Boring @ 12 feet - Stopped at bedrock.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-B4

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 10-24-95 End 10-24-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 12 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP			0 / 0	0 ppm			OL/OH	Dark gray to black silty CLAY topsoil with plant material, damp
								Pale yellow, medium to coarse grained cemented SAND with fill, damp
GP	SB-B4S			0 ppm			CL	Dark brown silty CLAY, stiff to medium stiff, damp to moist
GP			-5 / 5	0 ppm			ML	Light brown clayey SILT with some sand and gravel, medium dense, damp
GP	SB-B4D		-10 / 10	0 ppm			CL	Dark brown silty CLAY, stiff, damp to moist, stiff to medium at 8-11.3 ft.
GP			-15 / 15	0 ppm			GP	Gray to tan GRAVEL, poorly graded, with up to 1" diameter nodules (possibly limestone) with vesicles
								Bottom of Boring @ 12 feet - Stopped at bedrock.

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-C1

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-03-95 End 11-03-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 8 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-C1S	85%	0 / 0	0 ppm			OL/OH	Brown topsoil with fill (wood and gravel)
GP		85%		0 ppm			CL	Gray to black silty CLAY, medium stiff, damp to moist, hydrocarbon like odor and wet black liquid on core and soil grains
GP	SB-C1D	85%	-5 / 5	0 ppm			CL	Brown silty CLAY, medium stiff, damp to moist, wet at approximately 4.5 - 5.5 ft.
GP				0 ppm			SC	Brown sandy CLAY with some gravel (loose), clay (stiff), moist
			-10 / 10					*Bottom of Boring @ 8 feet - Stopped at weathered bedrock (dolomite).*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-C2

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-31-95 End 10-31-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 6 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-C2S	50%	0 / 0	0 ppm			OL/OH	Topsoil with plant material
GP		50%		0 ppm				*Fill material*
GP		30%		0 ppm			GW	Light brown SAND with some gravel, loose, moist to wet
GP	SB-C2D	30%	-5 / 5	0 ppm			CL	Dark brown silty sandy CLAY, medium stiff, moist to wet, black coating on grains, hydrocarbon like odor present
								Bottom of Boring @ 6 feet.
			-10 / 10					
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-C3

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-30-95 End 10-30-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-C3S	100%	0 / 0	0 ppm			OL/OH	Black topsoil with plant material
GP	SB-C3S	100%		0 ppm				Fill material (wood and gravel)
GP	SB-C3S	100%	-5 / 5	0 ppm			CL	Dark to light brown silty CLAY with some gravel, medium stiff, damp, some coal pieces, black coating on clay with hydrocarbon like odor present
GP	SB-C3D	100%		0 ppm			CL	Black silty CLAY, medium stiff, damp
GP	SB-C3D	100%	-10 / 10	0 ppm			CL	Gray silty sandy CLAY with traces of gravel, medium stiff, damp
GP	SB-C3D	100%		0 ppm			GW	Gray to black gravelly SAND, loose, wet
			-15 / 15					*Bottom of Boring @ 12 feet.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-C4

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-30-95 End 10-30-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-C4S	75%	0 / 0	0 ppm			OL/OH	Brown topsoil with gravel fill
GP	SB-C4S	75%		0 ppm				Dark brown to black gravel fill, wet, water and soil has a product sheen and hydrocarbon like odor
GP	SB-C4S	60%	-5 / 5	0 ppm			CL	Dark brown silty CLAY with some gravel, medium stiff, moist to wet, water and soil from 4' to 12' has a product sheen and hydrocarbon like odor
GP	SB-C4D	60%	-10 / 10	0 ppm			CL	Dark brown silty sandy CLAY, stiff to medium, wet black coating on soil with hydrocarbon like odor
GP	SB-C4D	60%		0 ppm				Bedrock
			-15 / 15					*Bottom of Boring @ 12 feet - Stopped at bedrock.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-C5

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 10-31-95 End 10-31-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 8 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-C5S	75%	0 / 0	0 ppm				Fill material stained with black liquid, very strong hydrocarbon like odor
GP	SB-C5D	75%	-5 / 5	0 ppm			CL	Dark brown silty CLAY, medium stiff, damp to moist, stained with black liquid, strong hydrocarbon like odor, free product noted at 3.5 - 8 ft.
			-10 / 10					*Bottom of Boring @ 8 feet.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-C6

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-03-95 End 11-03-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 7.5 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-C6S	100%	0 / 0	0 ppm				Fill material (slag and gravel), wet black coating and strong hydrocarbon like odor
GP	SB-C6S	100%		0 ppm			CL	Brown silty CLAY, stiff, damp, black coating on core
GP	SB-C6D	50%	-5 / 5	0 ppm			SC	Brown sandy CLAY with some gravel, loose, wet, wet black coating on core and grains and strong hydrocarbon like odor
GP	SB-C6D	50%		0 ppm				Weathered bedrock
			-10 / 10					*Bottom of Boring @ 7.5 feet.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-E1

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-31-95 End 10-31-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-E1S	80%	0 / 0	1 ppm				Fill material (brick pieces, gravel, glass, and some clay), black coating and a hydrocarbon like odor, water encountered at 2 ft.
GP		80%	-5 / 5	0 ppm				
GP	SB-E1D	80%	-10 / 10	0 ppm			CL	Dark brown silty CLAY with some sand, stiff, moist to wet, some fill material (brick)
			-15 / 15					*Bottom of Boring @ 12 feet - Stopped at weathered bedrock.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-E2

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-26-95 End 10-26-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 8 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-E2S	70%	0 / 0	0 ppm			OL/OH	Black topsoil with some plant material and gravel
GP		70%		0 ppm				Fill material (gray and black gravel)
GP		70%		0 ppm				
GP		70%		0 ppm			CL	Dark brown silty CLAY, medium stiff to stiff, damp to moist, black coating on soil and strong hydrocarbon like odor from 6-8 ft.
GP	SB-E2D		-5 / 5	0 ppm				
GP				170 ppm				
			-10 / 10					*Bottom of Boring @ 8 feet - Stopped at bedrock (dolomite)*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-E3

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-26-95 End 10-26-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-E3S	100%	0 / 0	0 ppm				Fill material (black gravel)
GP	SB-E3S	100%		0 ppm			CL	Gray to black silty CLAY with some gravel, medium stiff, damp gravel at 3.5 ft. (2" diameter limestone or dolomite cobbles)
GP	SB-E3D	95%	-5 / 5	0 ppm			SC	Light brown sandy CLAY, medium stiff to stiff, damp
GP	SB-E3D		-10 / 10	0 ppm			SM	Light brown silty SAND, poorly graded, wet at 11-12 ft.
			-15 / 15					*Bottom of Boring @ 12 feet.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-E4

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-04-95 End 11-04-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 6.5 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: John Boyer

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
		75%	0 / 0	0 ppm			OL/OH	Black topsoil
		75%		0 ppm				Fill material (gray gravel, medium coarse, dry)
GP	SB-E4S	75%		0 ppm			CL	Brown silty CLAY with some medium fine gravel, medium stiff, dry
		100%		0 ppm				Medium/dark brown CLAY with little silt and some coarse/medium gravel (black), medium stiff, dry
GP	SB-E4D	100%	-5 / 5	0 ppm			CL	
								Bottom of Boring @ 6.5 feet - Stopped at bedrock.
			-10 / 10					
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-F2

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-26-95 End 10-26-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-F2S	100%	0 / 0	0 ppm			OL/OH	Black to dark brown topsoil with plant material; Some clay at 6.5 ft.
GP	SB-F2D	100%	-5 / 5	0 ppm				Fill material (brick and gravel)
GP			-10 / 10	0 ppm			CL	Dark brown silty CLAY with coal pieces, medium stiff, damp
GP				0 ppm				Bedrock (limestone or dolomite)
			-15 / 15					*Bottom of Boring @ 12 feet - Stopped at bedrock.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-F3

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-25-95 End 10-25-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-F3S		0 / 0	0 ppm			DL/OH	Black topsoil with plant material
GP	SB-F3S			0 ppm			CL	Dark brown silty CLAY, damp
GP			-5 / 5	0 ppm				Fill material (brick) and light gray coarse gravel with up to 1.5" diameter nodules
GP				0 ppm			CL	Light to dark brown silty CLAY, medium stiff, damp
GP	SB-F3D		-10 / 10	0 ppm			SW	Light brown SAND with some gravel, loose, fine to medium grained, some clay at 11.5-12 ft.
			-15 / 15					*Bottom of Boring @ 12 feet.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-F4

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 10-25-95 End 10-25-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 8 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-F4S		0 / 0	0 ppm			OL/OH	Black topsoil with plant material
								Fill material (brick pieces) with some clay
GP	SB-F4D		-5 / 5	0 ppm				
								Weathered bedrock (limestone or dolomite)
			-10 / 10					*Bottom of Boring @ 8 feet - Stopped at bedrock.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-F5

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-26-95 End 10-26-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 6.5 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-F5S	60%	0	0 ppm				Black topsoil with plant and fill material (wood pieces and gravel)
GP	SB-F5D	60%	-5	0 ppm			CL	Dark brown silty CLAY with some sand and gravel, damp to moist, stiff to medium stiff, depositional clay laminae, fill material (nails) at 5 ft.
GP		60%		0 ppm			SM	Light brown silty SAND, loose, fine to medium grained
			-10					*Bottom of Boring @ 6.5 feet - Stopped at weathered bedrock (dolomite cobbles).*
			-15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-F6

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-27-95 End 10-27-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 8.5 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-F6S	60%	0 / 0	0 ppm				Fill material with 2" diameter gravel
GP	SB-F6S	65%		0 ppm			CL	Dark brown silty CLAY, medium stiff, damp, some coal pieces, black coating at 3.5-4 ft.
			-5 / 5					
GP	SB-F6D	90%		0 ppm			GW	Gray GRAVEL
GP		90%		0 ppm			CL	Black to maroon CLAY, soft, laminae (<1 mm) alternating tan/black
GP		90%		0 ppm			CL	Dark brown CLAY with distinct depositional layering (<6.1 mm), soft, wet, depositional laminae alternating between tan/black/brown
							SW	Light brown SAND, loose, wet, some black staining
			-10 / 10					*Bottom of Boring @ 8.5 feet - Stopped at weathered bedrock.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-F8

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 11-03-95 End 11-03-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 6.5 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
			0 / 0					
GP	SB-F8S	50%		0 ppm				Fill material
GP	SB-F8D	30%		0 ppm			CL	Light brown CLAY, soft, dry
GP		90%	-5 / 5	0 ppm			CL	Dark brown silty sandy CLAY with some gravel, medium stiff, damp
GP		90%		0 ppm			SW	Light brown SAND, poorly graded
GP				0 ppm				Weathered bedrock (dolomite)
			-10 / 10					*Bottom of Boring @ 6.5 feet.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-F9

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 11-03-95 End 11-03-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 12 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-F9S	70%	0/0	0 ppm			OL/OH	Black topsoil with plant material
GP		70%		0 ppm			CL	Dark brown to black silty CLAY, medium stiff, damp
GP		70%		0 ppm			CL	Light brown silty sandy CLAY with some gravel, soft, damp
GP		50%	-5/5	0 ppm				Fill material (slag and 2" diameter cobbles)
GP	SB-F9D	95%	-10/10	0 ppm			CL	Dark brown silty CLAY, medium stiff, damp, some slag pieces, black coating on core
							SW	Gray gravelly SAND, loose, wet black coating and slight hydrocarbon like odor
			-15/15					*Bottom of Boring @ 12 feet.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-G1

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-27-95 End 10-27-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 7.5 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-G1S	100%	0 / 0	0 ppm			OL/OH	Topsoil with some fill material (coal pieces) and hydrocarbon like odor, black coating on grains
GP	SB-G1S	100%		0 ppm			CL	Dark to light brown sandy silty CLAY, medium stiff, damp to moist with some gravel, black coating at 4.75-5.25 ft.
GP	SB-G1D	100%	-5 / 5	0 ppm			SC	Gray sandy CLAY, soft, wet
GP	SB-G1D	100%		0 ppm			CL	Dark to light brown sandy silty CLAY, medium stiff, damp to moist
			-10 / 10					*Bottom of Boring @ 7.5 feet - Stopped at weathered bedrock.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-G2

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-01-95 End 11-01-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 10 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Jeanne Riley

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-G2S	100%	0 / 0	0 ppm			SW	Dark brown coarse SAND, loose, wet
GP	SB-G2S	100%		0 ppm			ML	Red-brown SILT with trace of coarse sand and clay, moist, stiff
GP	SB-G2D	100%	-5 / 5	0 ppm			ML	Gray-brown SILT with trace of fine gravel and medium sand, stiff, moist
GP	SB-G2D	100%		0.8 ppm			ML	Gray SILT with trace coarse sand, very stiff, dry
			-10 / 10					*Bottom of Boring @ 10 feet.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-G3

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-01-95 End 11-01-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 8 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Jeanne Riley

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-G3S	25%	0 / 0	28 ppm			SW	Dark brown fine to coarse SAND, loose, moist, with trace coarse gravel, plant material and slag
GP	SB-G3D	50%	-5 / 5	1.6 ppm			GW	Dark brown medium to coarse SAND, loose, moist, some fine to coarse gravel
			-10 / 10					*Bottom of Boring @ 8 feet - Stopped at slag material.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-G4

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 10-27-95 End 10-27-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 12 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
			0 / 0					
GP	SB-G4S	100%		0 ppm				Fill material (gravel), black coating and strong hydrocarbon like odor
			-5 / 5					
GP		100%		0 ppm			CL	Dark to light brown silty CLAY with some gravel, medium stiff, damp to moist
GP	SB-G4D	100%	-10 / 10	0 ppm			GW	Gray SAND with some gravel, loose to very loose, wet
								Bottom of Boring @ 12 feet - Stopped at weathered bedrock.
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-G7

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-02-95 End 11-02-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-G7S	95%	0 / 0	0 ppm				Fill material (slag and gravel), damp to moist
GP		95%	-5 / 5	0 ppm			CL	Light brown silty CLAY, medium stiff, damp to moist, black coating on core
GP	SB-G7D	100%		0 ppm			CL	Dark brown to gray silty CLAY with some sand, mottled black, black coating on grains
								Fill material
GP		100%	-10 / 10	0 ppm			CL	Gray silty sandy CLAY with some gravel, medium stiff, damp to moist
GP		100%		0 ppm			GW	Gray sand and gravel, well graded, loose, damp
			-15 / 15					*Bottom of Boring @ 12 feet.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG

SB-H1

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-01-95 End 11-01-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 12 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Jeanne Riley

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-H1S	100%	0 / 0	0 ppm				Brown to dark brown SILT, stiff, damp, some clay, little fine gravel, trace plant material FILL
GP		100%		0 ppm				Brown-red (mottled) SILT, stiff, dry, some clay and trace coarse sand
GP		100%	-5 / 5	0 ppm			CL	
GP	SB-H1D	100%	-10 / 10	0 ppm				
			-15 / 15					*Bottom of Boring @ 12 feet - Stopped at bedrock.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
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NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-H2

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 10-26-95 End 10-26-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 9.5 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Andrew Kear

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-H2S	100%	0 / 0	0 ppm			OL/OH	Black topsoil with plant material and wood pieces
GP	SB-H2S	100%		0 ppm			SM	Dark brown fine grained silty SAND with some clay, poorly graded, damp (1.5-2 ft.), dry at 2 ft.
							CL	Dark brown silty CLAY, stiff, damp
GP	SB-H2D	75%	-5 / 5	0 ppm			SM	Dark brown fine grained silty SAND, poorly graded, dry
GP	SB-H2D	75%		0 ppm			SC	Brown sandy CLAY with some silt, stiff, dry
			-10 / 10					*Bottom of Boring @ 9.5 feet - Collapsing hole, resistance at 9.5 ft. - Possibly bedrock.*
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
40 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-H3

Client: Indiana Department of Environmental Management
Project Number: 2673-100
Drilling Contractor: Imaging Subsurface Inc.
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Surface Elevation: Ft.
Field Screening Instrument: OVM (scan)
Abandonment Method: Fill w/ granualar bentonite
Logged By: Jeanne Riley

Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: Kokomo, IN
Drilling Date: Start 11-01-95 End 11-01-95
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Total Depth: 3 Ft.
Depth To Initial Water Level (GS): N/A

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
GP	SB-H3S	75%	0 / 0	0 ppm			SW	Dark brown medium to coarse SAND, poorly graded, loose, damp, some fine to coarse gravel fill
			-5 / 5					*Bottom of Boring @ 3 feet - Stopped at slag material.*
			-10 / 10					
			-15 / 15					

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
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SAMPLING TYPES:
AS - Auger/Grab Sample
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BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CAMP DRESSER & McKEE
CDM
401 Pennsylvania Parkway, Suite 104
Indianapolis, Indiana 46980

GEOPROBE LOG
SB-H4

Client: Indiana Department of Environmental Management
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Number: 2673-100
Project Location: Kokomo, IN
Drilling Contractor: Imaging Subsurface Inc.
Drilling Date: Start 11-05-95 End 11-05-95
Drilling Method/Rig: Macro Sampler/Geoprobe Rig
Drillers: Geoffrey Ssenkoloto, Rakesh Sarman
Surface Elevation: Ft.
Total Depth: 16 Ft.
Field Screening Instrument: OVM (scan)
Depth To Initial Water Level (GS): N/A
Abandonment Method: Fill w/ granualar bentonite
Logged By: Lisa Swan

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	ELEV. DEPTH	FIELD INSTRU. READING	BLOWS PER 6 INCH	GRAPHIC LOG	USCS CLASS.	MATERIAL DESCRIPTION
			0 / 0					Brown to black fill material with some coarse to medium grained sand and trace gravel, dry
GP	SB-H4S		-5 / 5	0 ppm				
			-10 / 10					Brown to black sandy CLAY with some silt, dry
GP	SB-H4D			0 ppm			SC	
			-15 / 15					*Bottom of Boring @ 16 feet - Stopped at bedrock.*

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
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HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

Figure No.

CONTINENTAL STEEL SUPERFUND SITE BUILDING NO. _____

DETAILED INSPECTION OF MAIN PLANT BUILDINGS

Note: The reason for performing this inspection is to accurately identify and quantify potential sources of environmental contamination within the buildings. The data collected will be used to prepare a scope-of-work and cost estimate for remediating the Main Plant. For each building or area that is numbered, complete this checklist and attach descriptions of all observations. Identify all observations on the attached building plan. Update the building plan to show interior walls, basements, etc.

Characterize building construction details (check as appropriate)

Steel structure (Y/N) Sheet Metal Exterior (Y/N) Cement Block Walls (Y/N) Pitched Roof (Y/N)

Flat Roof (Y/N) Concrete Floor (Y/N) Brick Floor (Y/N) Basement (Y/N) Machine Pits (Y/N) Floor

Trenches (Y/N) Manufacturing Area (Y/N) Office Area (Y/N) Manholes (Y/N) Sumps (Y/N)

Other (Y/N) General Description of Apparent Use_____

_____

_____

_____

_____

Estimate the interior size of the structure Length _____ feet (north-south)

Width _____ feet (east-west) Height _____ feet

Observations of each building (circle, describe, and attach separate sheets, as necessary)

Evidence of USEPA Cleanup (Y/N) Describe condition, etc.

_____

_____

Debris in Piles (Y/N) Describe contents, quantity, color, size, location, etc.

_____

_____

Debris Scattered on Floor (Y/N) Describe contents, thickness, color, quantity, location, etc.

_____

_____

Dust on Floors (Y/N) on Interior Roof (Y/N) on Beams (Y/N) Describe contents, thickness, color, quantity, location, etc. _____

_____

_____

Basement Present (Y/N) Describe water depth, color, and quantity; itemize debris in basement, evidence of sheen or floating fuels, accessibility (e.g., steps), etc.

_____

_____

Manholes or sumps (Y/N) Describe contents, color, record pipes entering/leaving, flow, etc.

_____

_____

Tanks or vats (Y/N) Describe contents, quantity, color, size, location, tank markings, USEPA No, etc.

_____

_____

Mercury Switches (Y/N) Describe location, number, condition, accessibility, etc.

_____

_____

Transformer (Y/N) Describe location, nameplate markings, PCBs, USEPA number, etc.

_____

_____

Capacitors (Y/N) Describe location, nameplate markings, PCBs, USEPA number, etc.

_____

_____

IDW Drums (Y/N) Describe condition, quantity, location, marking, etc.

_____

_____

IDW Tote Bags (Y/N) Describe condition, quantity, location, marking, etc.

_____

_____

APPENDIX E

Air Impact Analysis for the Markland Avenue Quarry

Air Impact Analysis for the Markland Avenue Quarry
Table of Contents

Air Impact Analysis for the Markland Avenue Quarry

1 Purpose

The air impact analysis was performed to evaluate potential off-site impacts of five chemicals, arsenic, barium, cadmium, chromium and lead, for the Continental Steel Superfund Site (CSSS) Markland Avenue Quarry in Kokomo, Indiana.

This analysis provides a conservative estimate of the downwind concentrations of airborne compounds associated with fugitive dust movement from the CSSS Markland Avenue Quarry. Conservative assumptions for emission estimates and dispersion techniques were used to estimate the potential maximum off-site concentrations of the chemicals of concern originating from the quarry surface soils. The resulting predicted off-site impacts are compared to proposed Indiana air toxics standards and are used to perform the health risk assessment for the air pathway.

1.1 Emission Estimating

Onsite soil particles are entrained into the air by tractive force resulting from wind blowing across the ground surface. Entrainment of the impacted soil is the primary release mechanism for the chemicals of concern to the air pathway. Since the chemicals of concern are not volatile, volatilization from soil is not a viable release mechanism. The chemicals of concern in the soil are assumed to become airborne with the soil. Emissions of arsenic, barium, cadmium, chromium and lead are estimated from contaminated soil concentrations at the CSSS Markland Avenue Quarry.

1.2 Estimated Soil Concentrations for Chemicals of Concern

Soil concentrations of arsenic, barium, cadmium, chromium and lead were based on the results of 26 surface soil samples collected at the 23-acre Markland Avenue Quarry in November 1995 (see **Table 1**). One short-term concentration and one long-term concentration were chosen to represent each chemical of concern for the Markland Avenue Quarry source area. The maximum concentration of the soil samples was chosen to represent the short-term

TABLE 1
MARKLAND AVENUE QUARRY
SURFACE SOIL SAMPLING RESULTS
SAMPLE DATE: NOVEMBER 13, 1995
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Sample No.	Soil Concentration				
	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)
MS-01	59	42	6	50	290
MS-02	58	31	6	81	170
MS-03	42	20	5	77	160
MS-04	120	690	28	2,200	1,500
MS-05	120	240	8	2,800	220
MS-06	81	40	8	100	280
MS-07	76	160	11	900	730
MS-08	91	240	8	1,800	370
MS-09	55	87	5	55	77
MS-10	80	91	35	140	310
MS-11	43	34	5	120	78
MS-12	100	100	4	290	170
MS-13	71	93	8	230	290
MS-14	84	63	8	1,200	940
MS-15	110	540	14	330	700
MS-16	85	22	ND*	110	84
MS-17	110	140	10	930	660
MS-18	80	82	ND	740	400
MS-19	83	350	8	1,200	660
MS-20	66	51	9	120	840
MS-21	100	140	36	1,200	2,400
MS-22	74	65	8	140	820
MS-23	120	240	7	1,800	360
MS-24	55	55	ND	79	120
MS-25	87	61	ND	22	80
MS-26	47	20	ND	10	ND
Maximum Concentration:	120	690	36	2,800	2,400
Average Concentration:	81	142	11	643	508

* ND = Not detected above the laboratory quantitation limits.

concentration for modeling of impacts using 8-hour and 24-hour averaging times. The average concentration was used to represent the long-term concentration for modeling of impacts using an annual averaging time. **Figure 1** provides the soil sample locations and source area for the Markland Avenue Quarry.

1.3 Estimate of Wind-Induced Soil Erosion

Estimates of wind-induced soil erosion are based on the U.S. EPA Fourth Edition AP-42 Guidance Document, *Compilation of Air Pollutant Emission Factors*, published in 1985. The 1995 AP-42 Fifth Edition method for estimating wind-induced soil erosion was not used because the period of disturbance, a required input for this method, is not defined for the CSSS Markland Avenue Quarry site since the soil is not being moved or excavated. However, both methods produce a comparable emission factor when 12 disturbances per year are assumed.

The 1985 AP-42 Fourth Edition method for estimating emissions from erosion of surface soil identifies the emission factor as follows:

$$E_s = 1.9\ (s/1.5)\ (365-p)/235\ (f/15)$$

where

E_s	=	total suspended particulate emission factor (kg/day/hectare)
s	=	silt content of aggregate
p	=	number of days with >= 0.25 mm (0.01 in.) of precipitation per year
f	=	percentage of time that the unobstructed wind speed exceeds 5.4 m/s

The silt content of aggregate is the proportion of dry aggregate material that passes through a 200 mesh screen using the ASTM-C-136 method. This method was not performed at CSSS. The silt content of the soil at the CSSS Markland Avenue Quarry is assumed to be 5.2 percent based on average values provided in the AP-42 documentation for iron and steel production slag.

The mean number of days per year with greater than or equal to 0.25 millimeters of precipitation is estimated at 123 days based on the National Oceanic and Atmospheric Administration data provided in the *Climates of the States* (1980) for the 30-year period between 1941 to 1970 for Indianapolis, Indiana.

The percentage of time that the unobstructed wind speed exceeds 5.4 meters per second is estimated at 25 percent based on wind roses developed from the National Climatic Data Center surface meteorological data for Indianapolis, Indiana for the period of 1988 through 1991.

concentration for modeling of impacts using 8-hour and 24-hour averaging times. The average concentration was used to represent the long-term concentration for modeling of impacts using an annual averaging time. **Figure 1** provides the soil sample locations and source area for the Markland Avenue Quarry.

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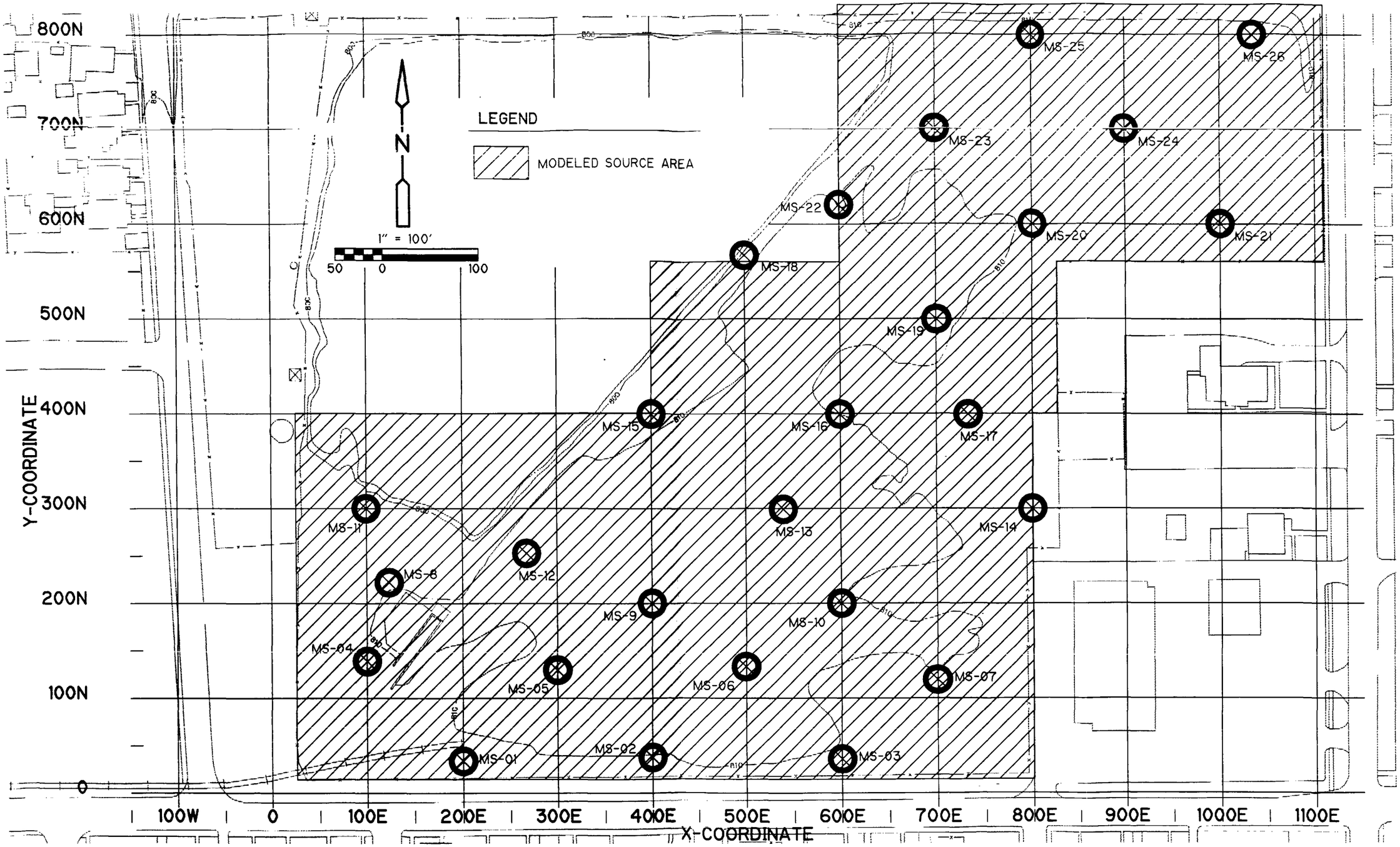


CDM
environmental engineers, scientists, planners, & management consultants

CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA
REMEDIAL INVESTIGATION

MARKLAND AVENUE QUARRY
SURFACE SOIL SAMPLE LOCATIONS
AND MODELED SOURCE AREA Figure 1

M. KUZEL, NMW-CHI 05/07/96 15:47:10 K:\2673\100\DRI\MODSAREA

Based on the above assumptions, the total suspended particulate emission factor is estimated at 11 kg/day/hectare or 1.31×10^{-8} kg/s/m^2.

1.4 Estimated Emission Factors for Chemicals of Concern

Arsenic, barium, cadmium, chromium and lead are assumed to become airborne with the suspended particulate. Emission factors of the chemicals of concern are calculated from the total suspended particulate emission factor and the estimated soil concentrations for each area, as follows:

$$E_c=(E_s)\,(C_c) / 1000$$

where

E_c = chemical of concern emission factor (g/s/m^2)
E_s = total suspended particulate emission factor (kg/s/m^2)
C_c = estimated soil concentration of constituent (mg/kg)

The on-site area sources are in various stages of vegetation. Since the vegetation limits the amount of soil that is available for wind erosion, the emission factor is multiplied by the non-vegetated fraction of the area. Based on observation, approximately 50 percent of the Markland Avenue Quarry source area is vegetated. **Table 2** provides a summary of the Markland Avenue Quarry emission estimates for arsenic, barium, cadmium, chromium and lead.

TABLE 2
SUMMARY OF EMISSION ESTIMATES
MARKLAND AVENUE QUARRY
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Pollutant	Averaging Time	Emissions ($g/s/m^2$)
Arsenic	Short-term	7.85E-10
	Annual	5.28E-10
Barium	Short-term	4.51E-09
	Annual	9.30E-10
Cadmium	Short-term	2.36E-10
	Annual	7.38E-11
Chromium	Short-term	1.83E-08
	Annual	4.21E-09
Lead	Short-term	1.57E-08
	Annual	3.33E-09

2 Air Dispersion Modeling

The U.S. EPA Industrial Source Complex Short Term (ISCST3) dispersion model, version 95250, was used to predict 8-hour, 24-hour and annual maximum concentrations at fence line and off-site receptors. ISCST3 is a Gaussian air quality dispersion model which predicts pollutant concentrations at specified receptor points. Inputs to the ISCST3 model include area source characteristics, as described above, hourly meteorological data and ISCST3 modeling options.

2.1 Receptor Locations

Receptor locations include 104 offsite receptors and 49 fence line receptors. Off-site receptors are within a 1-kilometer grid around the Markland Avenue Quarry source area, with receptor locations spaced every 100 meters. The receptors do not represent actual homes. Fence line receptors are spaced every 25 meters. These receptors are assumed to be on the same elevation as the area source.

2.2 Meteorology

One year of hourly surface meteorological data from Indianapolis, Indiana and upper air meteorological data from Dayton, Ohio were used to model air impacts from the CSSS Markland Avenue Quarry. Indianapolis represents the closest station to CSSS for which hourly meteorological data is available; Dayton represents the closest station for which upper air data is available. Because 1991 is the most recent upper air meteorological data available from Dayton, the 1991 surface and upper air meteorological data was used for the air impact analysis.

2.3 Modeling Options

The modeling options govern the running of the model and define the form of the output. Regulatory default modeling options were used in the analysis. Because dispersion from volume and area sources are not affected by terrain, no terrain elevations are used in the analysis. Based on 1990 census population data, the area within a three kilometer radius of CSSS is classified as urban in accordance with the U.S. EPA Guideline on Air Quality Models (1986). Therefore, urban dispersion coefficients, vertical potential temperature gradients and wind profile exponents are used.

2.4 ISCST3 Modeling Assumptions

As discussed above, the ISCST3 model is a Gaussian dispersion model. Gaussian dispersion models depend on several assumptions, including ideal Gaussian distribution of the pollutants; constant meteorological conditions from sources to receptors; conservation of mass in the plume with complete reflection of pollutants reaching the ground and no absorption by vegetation or bodies of water; and conversion of concentrations for different averaging times using a general empirical relationship. According to Beychok (1996), who recently performed a sensitivity analysis for Gaussian dispersion models, Gaussian dispersion models may predict real-world plume concentrations within a factor of 10.

The air impact analysis also includes several assumptions specific to the CSSS Markland Avenue Quarry application. The following assumptions may further increase the error in the predicted impacts using the ISCST3 Gaussian dispersion model:

The air impact analysis does not account for other sources in the area;

- The chemicals of concern are assumed to behave as gasses;
- Wet and dry deposition are not included in the analysis;
- The terrain is assumed to be uniform and flat; and
- Meteorology for 1991 is assumed to represent past and current conditions.

2.5 Predicted Impacts

Table 3 presents the results of the ISCST3 dispersion modeling performed for the CSSS Markland Avenue Quarry. The results show maximum predicted impacts for averaging times of 8 hours, 24 hours and 365 days. All maximum impacts occur at the fence line of the Markland Avenue Quarry.

TABLE 3
MAXIMUM PREDICTED IMPACTS
MARKLAND AVENUE QUARRY
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Chemical of Concern	8-Hour Impact ($\mu g/m^3$)	24-Hour Impact ($\mu g/m^3$)	Annual Impact ($\mu g/m^3$)
Arsenic	0.021	0.013	0.003
Barium	0.122	0.077	0.006
Cadmium	0.006	0.004	0.000
Chromium	0.493	0.311	0.027
Lead	0.423	0.266	0.021

2.6 Comparison to Indiana Standards

Table 4 presents a comparison of 8-hour impacts predicted by the dispersion model and the proposed Indiana air toxics standards. IDEM is proposing to use Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) as the basis for a standard to compare ambient levels of Hazardous Air Pollutants (HAPs). PELs are time weighted concentrations not to be exceeded during an 8-hour work shift of a 40-hour week. IDEM is proposing to use a safety factor of 200 with the PELs. The proposed air toxics standards for arsenic, barium, cadmium, chromium and lead are 0.05 mg/m^3, 2.5 mg/m^3, 1 mg/m^3, 2.5 mg/m^3 and 0.25 mg/m^3, respectively. **Table 4** shows that the 8-hour predicted impacts are below the proposed Indiana air toxics standards for arsenic, barium, cadmium and chromium and above the proposed Indiana air toxics standard for lead.

TABLE 4
COMPARISON OF MAXIMUM PREDICTED IMPACTS TO INDIANA STANDARDS
MARKLAND AVENUE QUARRY
CONTINENTAL STEEL SUPERFUND SITE
KOKOMO, INDIANA

Chemical of Concern	8-Hour Impact ($\mu g/m^3$)	8-Hour OSHA PEL ($\mu g/m^3$)	8-Hour Proposed Indiana Standard ($\mu g/m^3$)
Arsenic	0.021	10	0.05
Barium	0.122	500	2.50
Cadmium	0.006	200	1.00
Chromium	0.493	500	2.50
Lead	0.423	50	0.25

2.7 References

Beychok, Milton R. 1996. "Error Propagation in Stack Gas Dispersion Models." *The National Environmental Journal*, January/February 1996, pp. 33-37.

National Oceanic and Atmospheric Administration. 1980. *Climates of the States.* Gale Research Company, Detroit.

United States Environmental Protection Agency (U.S. EPA). 1985. *AP-42 Guidance Document: Compilation of Air Pollutant Emission Factors,* Fourth Edition. Office of Air Quality Planning and Standards, Research Triangle Park. September 1985.

United States Environmental Protection Agency (U.S. EPA). 1986. *Guideline on Air Quality Models* (Revised). Office of Air Quality Planning and Standards, Research Triangle Park. July 1986.

APPENDIX F

CDM and ABB-ES Well Logs

CDM Well Logs

CAMP DRESSER & McKEE

CDM

233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL

LA-03A

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC/SPROWLS
Surface Elevation (ft.): 792.2
Drilling Method/Rig: HOLLOW STEM AUGER, MUD/AIR ROTARY
Total Depth (ft.): 42.3
Drillers: Dan Dreyer, Andrew Morkham
Depth to Initial Water Level (ft. BGS): 23
Drilling Date: **Start** 10/24/95 **End** 11/27/95
Development Method: SUBMERSIBLE PUMP - HAND SURGE
Field Screening Instrument: OVM
Logged By: Andrea Putscher
Development Date: **Start** 11/30/95 **End** 11/30/95
Top of Riser Elevation (ft.): 794.78

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION
SS	UA-03-001	1.5'	0 ppm	6 5 4 6	0'-13': FILL-dk. brown SILT and very fine SAND with rubble, gravel, charred wood, brick fragments; light brown to gray with increasing depth;
SS	UA-03-002	1.8'		5 3 2 5	
SS	UA-03-003	0.1'		50/0.1	13.0'-15.0': Gray-yellow-brown, very fine SAND and SILT; cobbles rounded;
					15.0'-42.3': LIMESTONE/DOLOMITE; KOKOMO LIMESTONE;

GRAPHIC LOG

ELEV. DEPTH (ft.)
792.2 / 0
787.2 / 5
782.2 / 10
777.2 / 15
772.2 / 20

WELL CONSTRUCTION DETAIL
Protective Casing
Top of Riser
Ground Surface
GROUT
Riser - Sched. 40 PVC 2" dia.

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

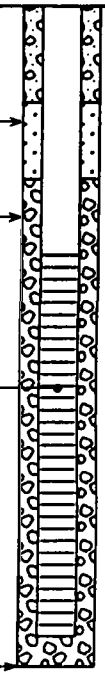
MONITORING WELL DETAIL

LA-03A

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					LISTON CREEK LIMESTONE, UNIT A:		762.2 / 30	FINE SAND →
								GRAVEL PACK →
							757.2 / 35	Screen - Sched. 40 PVC 2" dia., 0.010" slot
							752.2 / 40	
					Bottom of Exploration @42.3'			Bottom of Exploration @42.3' →
							747.2 / 45	
							742.2 / 50	
							737.2 / 55	
							732.2 / 60	



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MONITORING WELL DETAIL

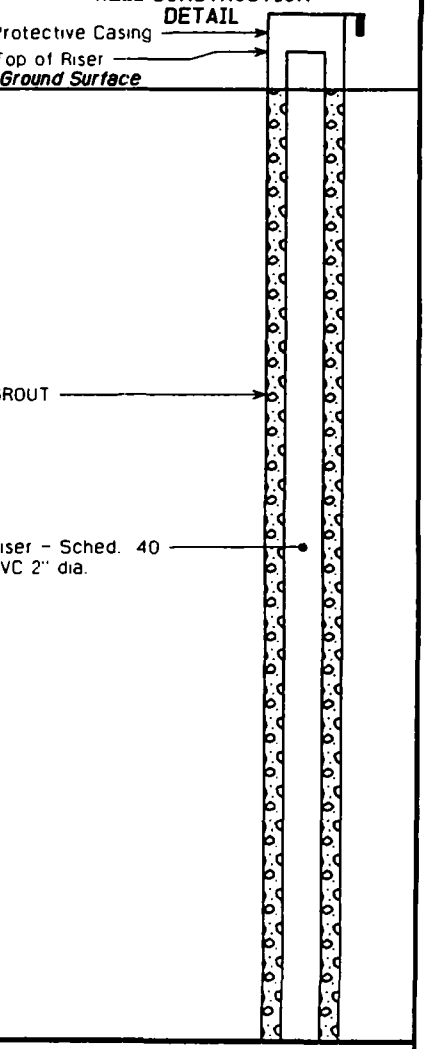
LA-03C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: SPROWLS/EDAC
Surface Elevation (ft.): 792.6
Drilling Method/Rig: Ingersoll Rand TM60
Total Depth (ft.): 95.8
Drillers: G. Puke
Depth to Initial Water Level (ft. BGS): NOT AVAILABLE
Drilling Date: **Start** 10/25/95 **End** 11/27/95
Development Method: SUBMERSIBLE PUMP - HAND SURGE
Field Screening Instrument: OVM
Logged By: Andrea Putscher
Development Date: **Start** 11/29/95 **End** 12/04/95
Top of Riser Elevation (ft.): 795.23

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. / DEPTH (ft.)
					0'-13': FILL-dk. brown SILT and very fine SAND with rubble, gravel, charred wood, brick fragments; light brown to gray with increasing depth;		792.6 / 0
							787.6 / 5
							782.6 / 10
					13.0'-15.0': Gray-yellow-brown, very fine SAND and SILT; cobbles rounded;		777.6 / 15
					15.0'-83': LIMESTONE/DOLOMITE; KOKOMO LIMESTONE;		772.6 / 20

WELL CONSTRUCTION DETAIL



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
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GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

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MONITORING WELL DETAIL

LA-03C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					LISTON CREEK LIMESTONE, UNIT A:		762.6 / 30 757.6 / 35 752.6 / 40 747.6 / 45 742.6 / 50 737.6 / 55 732.6 / 60	

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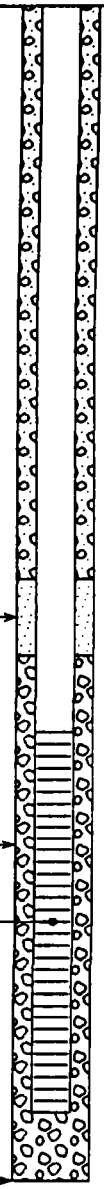
MONITORING WELL DETAIL

LA-03C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					LISTON CREEK LIMESTONE, UNIT B:		722.6 / 70	
							717.6 / 75	
							712.6 / 80	FINE SAND
					Light gray limestone:		707.6 / 85	GRAVEL PACK
							702.6 / 90	Screen - Sched. 40 PVC 2" dia., 0.010" slot
							697.6 / 95	Bottom of Exploration @95.8'
					Bottom of Exploration @95.8'		692.6 / 100	



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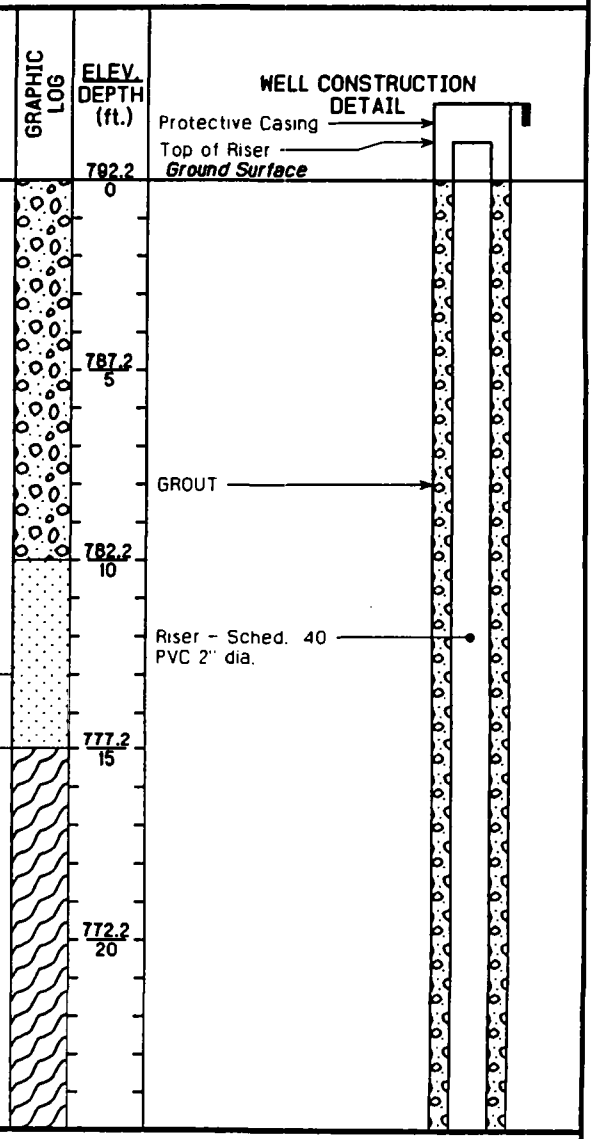
MONITORING WELL DETAIL
LA-03E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC
Drilling Method/Rig: GP-1300 ATV
Drillers: Dan Dreyer, Andrew Morkham
Drilling Date: **Start** 10/25/95 **End** 11/17/95
Development Date: **Start** 11/29/95 **End** 12/04/95
Surface Elevation (ft.): 792.2
Total Depth (ft.): 138.0
Depth to Initial Water Level (ft. BGS): 23
Development Method: SUBMERSIBLE PUMP - HAND SURGE
Field Screening Instrument: OVM
Logged By: Andrea Putscher
Top of Riser Elevation (ft.): 795.04

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION
	LA-03E-001	2.0/1.5	0 ppm	6 5 4 6	0'-13': FILL-dk. brown SILT and very fine SAND with rubble, gravel, charred wood, brick fragments; light brown to gray with increasing depth;
	LA-03E-002	2.0/1.8	0 ppm	5 3 2 5	
	LA-03E-003	0.1/0.1	0 ppm	50/0.1	13.0'-15.0': Gray-yellow-brown, very fine SAND and SILT: cobbles rounded;
					15.0'-83': LIMESTONE/DOLOMITE, KOKOMO LIMESTONE;



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
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RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

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233 South Wacker Drive, Suite 450
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MONITORING WELL DETAIL
LA-03E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					LISTON CREEK LIMESTONE, UNIT A:		762.2 / 30 757.2 / 35 752.2 / 40 747.2 / 45 742.2 / 50 737.2 / 55 732.2 / 60	

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MONITORING WELL DETAIL

LA-03E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					LISTON CREEK LIMESTONE, UNIT B:		722.2 / 70	
							717.2 / 75	
							712.2 / 80	
					Light gray limestone:		707.2 / 85	
							702.2 / 90	
							697.2 / 95	
							692.2 / 100	

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MONITORING WELL DETAIL

LA-03E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					110'-138': Olive green dolomite; MISSISSINEWA SHALE;		682.2 / 110	FINE SAND
							677.2 / 115	GRAVEL PACK
							672.2 / 120	Screen - Sched. 40 PVC 2" dia., 0.010" slot
							667.2 / 125	
							662.2 / 130	
							657.2 / 135	
					Bottom of Exploration @138'		652.2 / 140	Bottom of Exploration @138'

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MONITORING WELL DETAIL

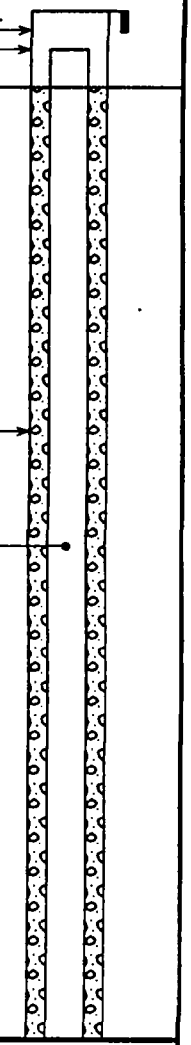
LA-101C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC
Surface Elevation (ft.): 803.50
Drilling Method/Rig: HSA/GP1300 ATV
Total Depth (ft.): 90
Drillers: Dan Dreyer, Anderew Morkham
Depth to Initial Water Level (ft. BGS): 19.6
Drilling Date: **Start** 11/1/95 **End** 11/28/95
Development Method: SUBMERSIBLE PUMP AND SURGE
Field Screening Instrument: OVM
Logged By: Michael Miller
Development Date: **Start** 11/30/95 **End** 12/04/95
Top of Riser Elevation (ft.): 806.57

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)
							803.5 / 0
AC					0'-1.0': Black CLAY, silty, with gravel;		
					1'-3.0': Brown CLAY, moist;		
SS	LA-101C-001		0 ppm	2 2 2 4	3.0'-5.0': Dark yellow brown SILT, clayey, moist, slight plasticity;		798.5 / 5
SS	LA-101C-002		0 ppm	4 4 100/4"	8.0'-9.5': Yellow brown SILT, clayey, moist;		
					9.5'-10.0': Very pale brown very weathered LIMESTONE with loose silt and gravel; KOKOMO LIMESTONE;		793.5 / 10
					15'-20': Lt. gray dolomite and limestone; KOKOMO LIMESTONE;		788.5 / 15
					20'-25': Med. gray banded dolomite; KOKOMO LIMESTONE;		783.5 / 20

WELL CONSTRUCTION DETAIL



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
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SAMPLING TYPES:
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BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

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CDM
233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL
LA-101C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					25'-30': Lt. gray to green dolomite; KOKOMO LIMESTONE;		773.5 / 30	
					30'-35': Lt. gray and brown med. calcareous dolomite; KOKOMO LIMESTONE ;		768.5 / 35	
					35'-40': Med. gray limestone; KOKOMO LIMESTONE;		763.5 / 40	
					40'-45': Med. to dk. gray limestone; KOKOMO LIMESTONE;		758.5 / 45	
					45'-50': Lt. to med. gray limestone; KOKOMO LIMESTONE;		753.5 / 50	
					50'-55': Dk gray limestone; KOKOMO LIMESTONE;		748.5 / 55	
					55'-60': Very lt. gray to green limestone; LISTON CREEK LIMESTONE, UNIT A;		743.5 / 60	
					60'-70': Med. gray limestone; LISTON CREEK LIMESTONE, UNIT A;			

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MONITORING WELL DETAIL

LA-101C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
							733.5 / 70	
					70'-80': Green/gray dolomitic limestone; LISTON CREEK LIMESTONE, UNIT A;			FINE/VERY FINE SAND
							728.5 / 75	GRAVEL PACK
							723.5 / 80	Screen - Sched. 40 PVC 2" dia., 0.010" slot
					80'-90': Dk. gray/green dolomitic limestone; LISTON CREEK LIMESTONE, UNIT B;			
							718.5 / 85	
							713.5 / 90	Bottom of Exploration @90.2'
					Bottom of Exploration @65' Note: deepened from 60' to 90' on 11/20/95.			
							708.5 / 95	
							703.5 / 100	

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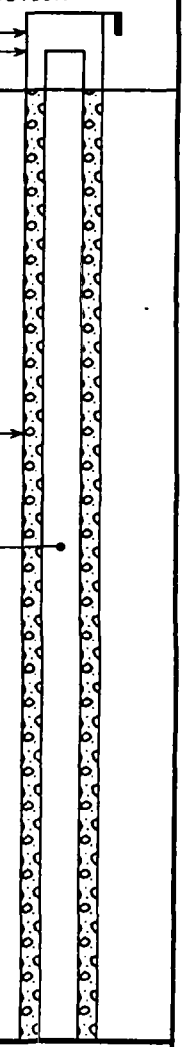
MONITORING WELL DETAIL

LA-102C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC
Surface Elevation (ft.): 798.60
Drilling Method/Rig: HSA/GP-750
Total Depth (ft.): 65
Drillers: Steve Wonder, Darrell Irwin
Depth to Initial Water Level (ft. BGS): 21.6
Drilling Date: Start 10/30/95 **End** 11/18/95
Development Method: SUBMERSIBLE PUMP AND SURGE BY PUMP BOUNCE
Field Screening Instrument: OVM
Logged By: Michael Miller
Development Date: Start 11/29/95 **End** 11/30/95
Top of Riser Elevation (ft.): 798.47

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	ELEV. DEPTH (ft.)
					0'-1.0': Topsoil	798.6 0
SS	LA-102-001		0 ppm	6 14 8 7	3'-5.0': Olive brown CLAY, silty, loose, dry;	793.6 5
SS	LA-102-002		0 ppm	23 18 26 27	8.0'-8.5': Olive brown CLAY, silty, loose, dry; 8.5'-8.7': Light olive brown SAND, coarse, subrounded, moist; 8.7'-10.0': Olive brown CLAY, silty, moderate plasticity, moist;	788.6 10
SS	LA-102-003		0 ppm	8 15 23 20	13.0'-15.0': Grayish brown CLAY, silty, dry to moist, trace green gravel, loose to moderate plasticity;	783.6 15
					18.0'-19.0': SAND;	
					19'-30': Medium gray calc. dolostone; KOKOMO LIMESTONE;	778.6 20



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
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SAMPLING TYPES:
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NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

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MONITORING WELL DETAIL

LA-102C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					30'-35': Lt. gray dolostone; KOKOMO LIMESTONE;		768.6 30	
					33'-38': Lt. gray limestone; KOKOMO LIMESTONE;		763.6 35	
					40'-45': Lt. gray to green limestone; KOKOMO LIMESTONE;		758.6 40	
					LISTON CREEK LIMESTONE, UNIT A;		753.6 45	
					50'-55': Lt. gray limestone; LISTON CREEK LIMESTONE, UNIT A;		748.6 50	VERY FINE SAND
					55'-60': Lt. gray to green limestone; LISTON CREEK LIMESTONE, UNIT A;		743.6 55	GRAVEL PACK Screen - Sched. 40 PVC 2" dia., 0.010" slot
					60'-65.5': Lt. gray dolomite; LISTON CREEK LIMESTONE, UNIT A;		738.6 60	
					Bottom of Exploration @65'			

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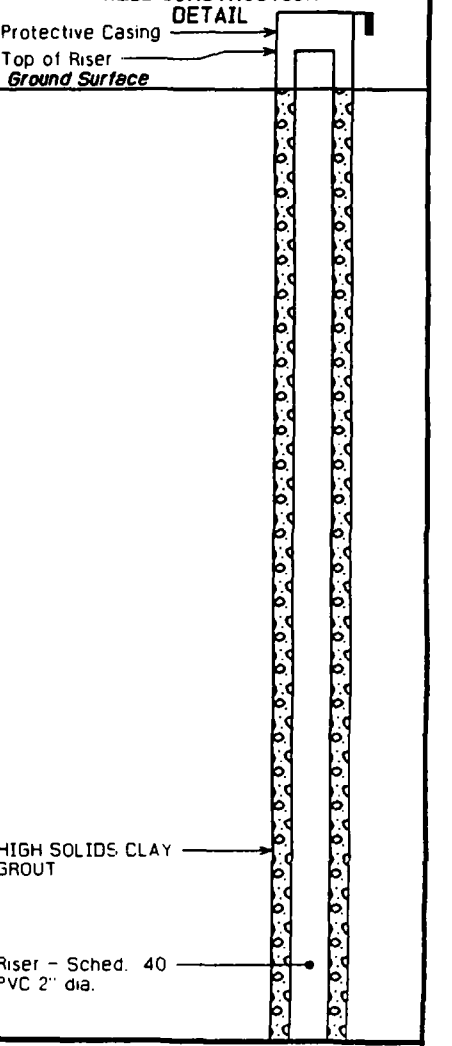
MONITORING WELL DETAIL

LA-103C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2873-100

Drilling Contractor: EDAC/SPROWLS
Surface Elevation (ft.): 792.40
Drilling Method/Rig: HOLLOW STEM AUGER
Total Depth (ft.): 69.6
Drillers: Steve Wonder, Darrell Irwin
Depth to Initial Water Level (ft. BGS): 28
Drilling Date: **Start** 11/4/95 **End** 11/18/95
Development Method: SUBMERSIBLE PUMP AND HAND BAIL
Field Screening Instrument: OVM
Logged By: Andrea Putscher
Development Date: **Start** 11/28/95 **End** 11/30/95
Top of Riser Elevation (ft.): 792.12

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	ELEV. DEPTH (ft.)
					0'-4.5': Moist, yellowish brown, very fine SAND, silt and clay;	792.4 / 0
SS	LA-103C-001	2'	0 ppm	4 8 11 13		
					4.5'-11.0': Rock chip, gravel and limestone flour;	787.4 / 5
SS	LA-103C-002	0.8'	0 ppm	7 12 19 24		782.4 / 10
					KOKOMO LIMESTONE;	777.4 / 15
					19.0'-30.0': Olive green calcareous dolomite; KOKOMO LIMESTONE;	772.4 / 20



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HP - Hydro Punch
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WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

CAMP DRESSER & McKEE

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MONITORING WELL DETAIL

LA-103C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					30'-35': Olive green sl. dolomitic limestone; LISTON CREEK LIMESTONE, UNIT A		762.4 / 30	
					35'-45': Med. grey calc. dolomite; LISTON CREEK LIMESTONE, UNIT A;		757.4 / 35	
							752.4 / 40	
					45'-55': Light Grey Limestone; LISTON CREEK LIMESTONE, UNIT A;		747.4 / 45	
							742.4 / 50	
					55'-69': Lt. grey very calcareous dolomite; LISTON CREEK LIMESTONE, UNIT A;		737.4 / 55	VERY FINE & FINE SAND
							732.4 / 60	MEDIUM GRAVEL PACK & COARSE SAND
					LISTON CREEK LIMESTONE, UNIT B;			Screen - Sched. 40 PVC 2" dia., 0.010" slot

CAMP DRESSER & McKEE
CDM
233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL
LA-103C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					LISTON CREEK LIMESTONE, UNIT B;			
					Bottom of Exploration @69.6'		722.4 / 70	Bottom of Exploration @69.6'
							717.4 / 75	
							712.4 / 80	
							707.4 / 85	
							702.4 / 90	
							697.4 / 95	
							692.4 / 100	

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MONITORING WELL DETAIL

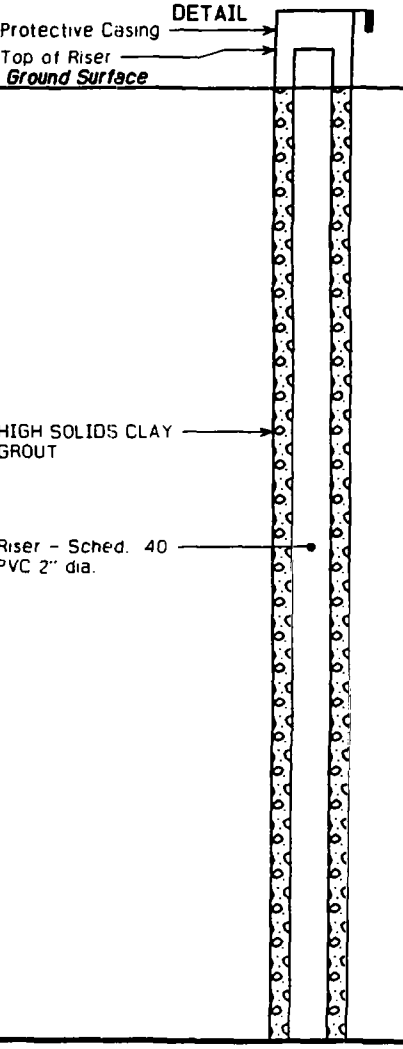
LA-104E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: SPROWLS
Surface Elevation (ft.): 806.10
Drilling Method/Rig: HSA/GP1300 ATV
Total Depth (ft.): 136
Drillers: Dan Dreyer, Andrew Morkham
Depth to Initial Water Level (ft. BGS): 35.8
Drilling Date: **Start** 11/3/95 **End** 11/15/95
Development Method: SUBMERSIBLE PUMP, HAND BAIL
Field Screening Instrument: OVM
Logged By: Michael Miller & Bob Robinson
Development Date: **Start** 11/28/95 **End** 12/04/95
Top of Riser Elevation (ft.): *808.83*

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)
							806.1
AS					0'-3.0': Brown CLAY, silty, loose;		0
SS	LA-104E-001		0 ppm	5 3 2 6	3.0'-5.0': Brown SILT, clayey, trace gravel and sand, moist, loose, slight plasticity;		801.1 5
SS	LA-104E-002		0 ppm	5 3 5 4	8.0'-10.0': Yellow brown SILT, clayey, loose, slight plasticity;		796.1 10
SS	LA-104E-003		0 ppm	6 9 11 15	13.0'-15.0': Dark yellow brown CLAY, stiff, and fine to coarse SAND, silty, moist;		791.1 15
SS	LA-104E-004		0 ppm	15 10 8 15	18.0'-20.0': Yellow brown SILT, clayey, trace sand, moist, soft, grading to gravel;		786.1 20
SS	LA-104E-005		0 ppm	15 27 52 57	23.0'-25.0': Dark yellow brown SILT, clayey, moist, soft, grading to SAND and GRAVEL;		

WELL CONSTRUCTION DETAIL



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

CAMP DRESSER & McKEE

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MONITORING WELL DETAIL

LA-104E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
SS	LA-104E-006		0 ppm	0-100/4"	28.0'-28.5': Gray GRAVEL; 28.5': Bedrock; KOKOMO LIMESTONE;		776.1 30	
					31.5'-40': Med. olive green dolomite; KOKOMO LIMESTONE;		771.1 35	
					40'-50': Lt. gray to green dolomite; KOKOMO LIMESTONE;		766.1 40 761.1 45	
					50'-60': Olive dolomite and dk. gray limestone; LISTON CREEK LIMESTONE, UNIT A;		756.1 50 751.1 55	
					60'-70': Med. gray dolomitic limestone; LISTON CREEK LIMESTONE, UNIT A;		746.1 60	

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MONITORING WELL DETAIL
LA-104E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					70'-80': Med. gray limestone; LISTON CREEK LIMESTONE, UNIT A;		736.1 / 70	
					80'-90': Lt. to med. gray dolomite and limestone; LISTON CREEK LIMESTONE, UNIT B;		731.1 / 75	
					90'-100': Lt. to med. gray limestone; LISTON CREEK LIMESTONE, UNIT B;		726.1 / 80	
					90'-125': Lt gray limestone; LISTON CREEK LIMESTONE, UNIT B;		721.1 / 85	
							716.1 / 90	
							711.1 / 95	
							706.1 / 100	

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MONITORING WELL DETAIL

LA-104E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
							696.1 / 110	VERY FINE & FINE SAND
							691.1 / 115	
								GRAVEL PACK
							686.1 / 120	Screen - Sched. 40 PVC 2" dia., 0.010" slot
					125'-136': Olive dolomite; MISSISSINEWA SHALE;		681.1 / 125	
							676.1 / 130	
							671.1 / 135	Bottom of Exploration @136'
					Bottom of Exploration @136'		666.1 / 140	

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MONITORING WELL DETAIL

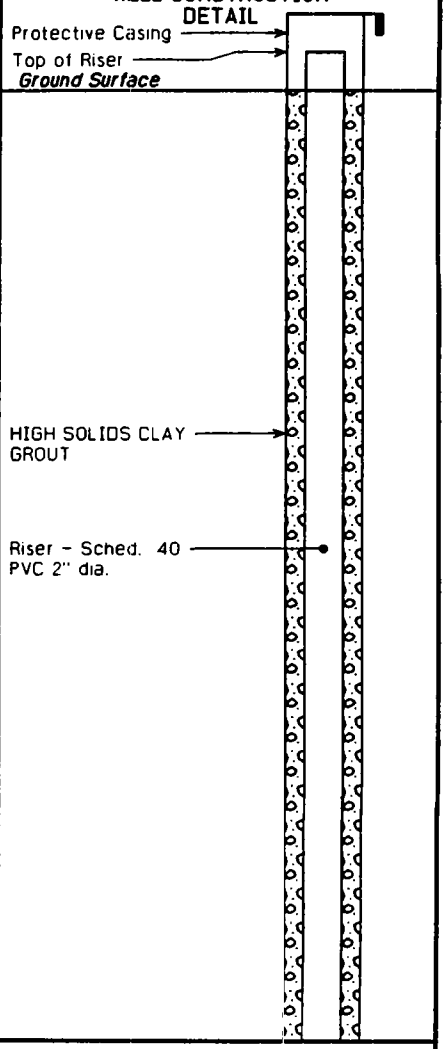
UA-105

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC
Surface Elevation (ft.): 801.1
Drilling Method/Rig: GP1300 ATV
Total Depth (ft.): 43.5
Drillers: Dan Dreyer
Depth to Initial Water Level (ft. BGS): 33
Drilling Date: **Start** 11/14/95 **End** 11/27/95
Development Method: SUBMERSIBLE PUMP
Field Screening Instrument: OVM
Logged By: Michael Miller
Development Date: **Start** 11/28/95 **End** 11/29/95
Top of Riser Elevation (ft.): 803.92

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)
					0'-3.0': Brown CLAY;		801.1 0
					1.0'-3.0': Black SAND and GRAVEL;		
					3.0'-5.0': Very dark brown and black CINDERS and GRAVEL; trace CLAY;		796.1 5
					No recovery;		791.1 10
					13.0'-15.0': Very dark gray CLAY, silty, with gravel;		786.1 15
					18.0'-18.5': Very dark gray CLAY, silty, fill with gravel and cinders;		781.1 20
					22.0'-30': Yellow/orange dolomite; KOKOMO LIMESTONE;		

WELL CONSTRUCTION DETAIL



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

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MONITORING WELL DETAIL

UA-105

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					30'-40': Lt. to dk. gray dolomite; KOKOMO LIMESTONE;		771.1 30	VERY FINE & FINE SAND
							766.1 35	GRAVEL PACK, MED. & COARSE SAND
								Screen - Sched. 40 PVC 2" dia., 0.010" slot
					40'-43.5': Dk. gray limestone; KOKOMO LIMESTONE;		761.1 40	
					Bottom of Exploration @43.5'			Bottom of Exploration @43.5
							756.1 45	
							751.1 50	
							746.1 55	
							741.1 60	

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MONITORING WELL DETAIL
LA-105C

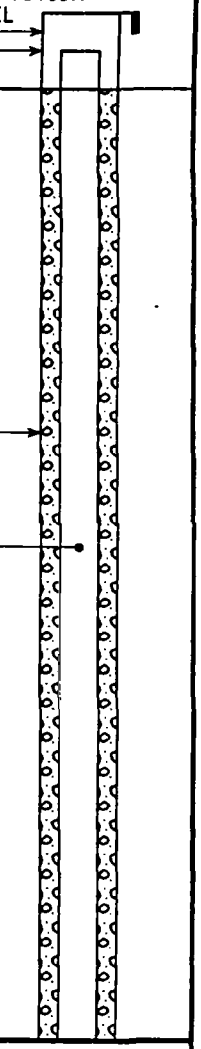
Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2873-100

Drilling Contractor: EDAC
Drilling Method/Rig: GP1300 ATV
Drillers: Dan Dreyer
Drilling Date: **Start** 11/13/95 **End** 11/27/95

Development Date: **Start** 11/28/95 **End** 11/29/95

Surface Elevation (ft.): 801.40
Total Depth (ft.): 71.5
Depth to Initial Water Level (ft. BGS): 35.8
Development Method: SUBMERSIBLE PUMP
Field Screening Instrument: OVM
Logged By: Andrea Putscher
Top of Riser Elevation (ft.): 804.31

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)
					0'-3.0': Brown CLAY;		801.4 0
					1.0'-3.0': Black SAND and GRAVEL;		
					3.0'-5.0': Very dark brown and black CINDERS and GRAVEL; trace CLAY;		796.4 5
					No recovery;		791.4 10
					13.0'-15.0': Very dark gray CLAY, silty, with gravel;		786.4 15
					18.0'-18.5': Very dark gray CLAY, silty, fill with gravel and cinders;		781.4 20
					22.0'-30': Yellow/orange dolomite; KOKOMO LIMESTONE;		



EXPLANATION OF ABBREVIATIONS

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GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
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WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

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MONITORING WELL DETAIL
LA-105C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					30'-40': Lt. to dk. gray dolomite; KOKOMO LIMESTONE;		771.4 / 30	
					40'-50': Dk. gray limestone; KOKOMO LIMESTONE;		766.4 / 35	
					50'-70': Lt. to dk. gray limestone; KOKOMO LIMESTONE;		761.4 / 40	
					LISTON CREEK LIMESTONE, UNIT A;		756.4 / 45	
							751.4 / 50	
							746.4 / 55	VERY FINE & FINE SAND
							741.4 / 60	GRAVEL PACK, MED. & COARSE SAND

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MONITORING WELL DETAIL

LA-105C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					70'-71.5': Lt. gray dolomitic limestone; LISTON CREEK LIMESTONE, UNIT A; Bottom of Exploration @71.5'		731.4 / 70	Screen - Sched. 40 PVC 2" dia., 0.010" slot; Bottom of Exploration @71.5
							726.4 / 75	
							721.4 / 80	
							716.4 / 85	
							711.4 / 90	
							706.4 / 95	
							701.4 / 100	

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MONITORING WELL DETAIL

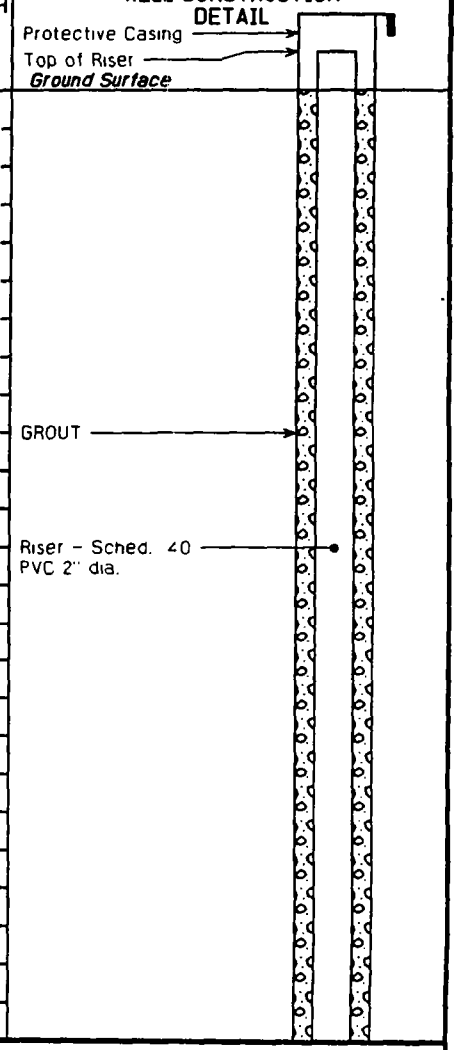
LA-105E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC
Surface Elevation (ft.): 801.30
Drilling Method/Rig: HSA/GP1300 ATV
Total Depth (ft.): 133
Drillers: Dan Dreyer, Andrew Morkham
Depth to Initial Water Level (ft. BGS): 34
Drilling Date: **Start** 11/2/95 **End** 11/16/95
Development Method: SUBMERSIBLE PUMP
Field Screening Instrument: OVM
Logged By: Michael Miller
Development Date: **Start** 11/28/95 **End** 11/28/95
Top of Riser Elevation (ft.): 804.41

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	ELEV. DEPTH (ft.)
					0'-3.0': Brown CLAY;	801.3 0
AS					1.0'-3.0': Black SAND and GRAVEL;	
SS	LA-105E-001		0 ppm	13 13 9 13	3.0'-5.0': Very dark brown and black CINDERS and GRAVEL; trace CLAY;	796.3 5
AS						
SS	LA-105E-002			15 10 5 5	No recovery;	791.3 10
SS	LA-105E-003		0.7 ppm	22 12 9 9	13.0'-15.0': Very dark gray CLAY, silty, with gravel;	786.3 15
SS	LA-105E-004		0.7 ppm		18.0'-18.5': Very dark gray CLAY, silty, fill with gravel and cinders;	781.3 20
					22.0'-30': Yellow/orange dolomite; KOKOMO LIMESTONE;	

WELL CONSTRUCTION DETAIL



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
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SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

CAMP DRESSER & McKEE
CDM
233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL

LA-105E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					30'-40': Lt. to dk. gray dolomite; KOKOMO LIMESTONE;		771.3 30	
					40'-50': Dk. gray limestone; KOKOMO LIMESTONE;		766.3 35	
					50'-70': Lt. to dk. gray limestone; KOKOMO LIMESTONE;		761.3 40	
					LISTON CREEK LIMESTONE, UNIT A;		756.3 45	
							751.3 50	
							746.3 55	
							741.3 60	

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MONITORING WELL DETAIL
LA-105E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					70'-80': Lt. gray dolomitic limestone; LISTON CREEK LIMESTONE, UNIT A;		731.3 / 70	
					80'-90': Lt. gray calcareous limestone; LISTON CREEK LIMESTONE, UNIT A;		726.3 / 75	
					90'-120': Lt. gray limestone; LISTON CREEK LIMESTONE, UNIT B;		721.3 / 80	
							716.3 / 85	
							711.3 / 90	
							706.3 / 95	
							701.3 / 100	VERY FINE & FINE SAND →

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MONITORING WELL DETAIL

LA-105E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
							691.3 / 110	GRAVEL PACK, MED. & COARSE SAND
							686.3 / 115	Screen - Sched. 40 PVC 2" dia., 0.010" slot
					120'-133': Med. to dk. gray dolomite; MISSISSINEWA SHALE;		681.3 / 120	
							676.3 / 125	
							671.3 / 130	
					Bottom of Exploration @133'		666.3 / 135	Bottom of Exploration @133'
							661.3 / 140	

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MONITORING WELL DETAIL

LA-106C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC/SPROWLS
Surface Elevation (ft.): 793.40
Drilling Method/Rig: HSA, MR, AR
Total Depth (ft.): 71.0
Drillers: Dan Dreyer, Andrew Markham/Dale Globe, Brian Wright
Depth to Initial Water Level (ft. BGS): 24
Drilling Date: Start 11/16/95 **End** 11/28/95
Development Method: SUBMERSIBLE PUMP AND SURGE
Field Screening Instrument: OVM
Logged By: Andrea Putscher
Development Date: Start 11/30/95 **End** 12/01/95
Top of Riser Elevation (ft.): 796.28

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	ELEV. DEPTH (ft.)
					0'-3.0': Cuttings are coarse to medium, yellow brown SAND, trace gravel;	793.4 0
SS	LA-106C-001	0.9'		6 4 1 2	3.0'-4.0': black and gray ash with wood chip;	
					4.0'-5.0': Rust colored SILT interlayered with decomposed lime, aggregate, ash-waste (FILL), moist;	788.4 5
SS	LA-106C-002	1.7'		1/2.0'	5.0'-8.0': Cuttings are rusted silt w/fluffy white mineralized lenses, moist; Orange silt, moist to wet;	
					Dark gray to black silt, moist to wet;	783.4 10
SS	LA-106C-003	0.6'		1 1 1 2		778.4 15
					Dense dk. gray to yellow gray SILT and decomposed lime;	
SS	LA-106C-004	0.7'		3 36 100/2	18.0'-19.0': Rust and gray, metallic luster very fine SAND and gravel;	773.4 20
					19.0-21.0': Dolomite bedrock fragments and yellow gray SILT w/metallic luster lenses;	
					21.0'-30': Dk. gray dolomite; KOKOMO LIMESTONE;	

WELL CONSTRUCTION DETAIL

Protective Casing
Top of Riser
Ground Surface
HIGH SOLIDS CLAY GROUT
Riser - Sched. 40 PVC 2" dia.

EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL

LA-106C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
							763.4 / 30	
					30'-40': Very dk. gray dolomite; KOKOMO LIMESTONE;		758.4 / 35	
					40'-45': Med. brown/tan dolomite; KOKOMO LIMESTONE;		753.4 / 40	
					45'-50': Lt. gray/green sh dolomitic limestone; KOKOMO LIMESTONE;		748.4 / 45	
					50'-55': Lt. green mod. dolomitic limestone; KOKOMO LIMESTONE;		743.4 / 50	
					55'-60': No sample;		738.4 / 55	VERY FINE & FINE SAND →
					60'-65': Very lt. gray/green dolomitic limestone; LISTON CREEEK LIMESTONE, UNIT A;		733.4 / 60	GRAVEL PACK, MED. & COARSE SAND →

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MONITORING WELL DETAIL

LA-106C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					65'-71': Very lt. gray dolomitic limestone; LISTON CREEK LIMESTONE, UNIT A;		723.4 / 70	Screen - Sched. 40 PVC 2" dia., 0.010" slot
					Bottom of Exploration @71.8'		718.4 / 75	Bottom of Exploration @71.5'
							713.4 / 80	
							708.4 / 85	
							703.4 / 90	
							698.4 / 95	
							693.4 / 100	

CAMP DRESSER & McKEE

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233 South Wacker Drive, Suite 450
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MONITORING WELL DETAIL

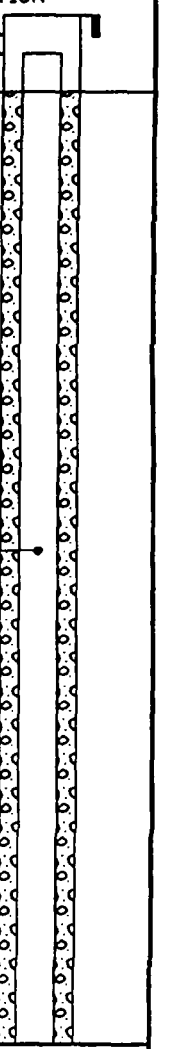
LA-107C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC
Surface Elevation (ft.): 801.00
Drilling Method/Rig: HSA/GP1300 ATV
Total Depth (ft.): 78.5
Drillers: Dan Dreyer, Andrew Morkham
Depth to Initial Water Level (ft. BGS): 63
Drilling Date: **Start** 11/07/95 **End** 11/19/95
Development Method: SUBMERSIBLE PUMP AND SURGE
Field Screening Instrument: OVM
Logged By: *Michael Miller*
Development Date: **Start** 11/27/95 **End** 11/27/95
Top of Riser Elevation (ft.): 803.80

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)
					0'-3.0': Dark grayish brown CLAY, silty;		801.0 0
SS	LA-107C-001		0 ppm	100/0"	*No recovery;*		796.0 5
AS					5.0'-8.0': Dark gray SILT, clay, moist fine;		
SS	LA-107C-002		0 ppm	15 15 4 4	8.0'-10.0': Light brownish gray CLAY, moist, plastic, trace gravel gray mottles;		791.0 10
SS	LA-107C-003		0 ppm	17 4 8 15			786.0 15
SS	LA-107C-004		0 ppm	3 14 15 17	18.0'-20.0': Gray SILT, clayey, dry, loose, fine, *low plasticity;*		781.0 20
SS	LA-107C-005		0 ppm	34 18 19 21	23.0'-25.0': Gray SILT, clayey with silt lenses, moist loose, low plasticity, fine;		

WELL CONSTRUCTION DETAIL



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
FR - Foam Rotary
MR - Mud Rotary
RC - Reverse Circulation
CT - Cable Tool
JET - Jetting
D - Driving
DTC - Drill Through Casing

SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
Bx - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

CAMP DRESSER & McKEE

CDM

233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL

LA-107C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					28.0': Bedrock; KOKOMO LIMESTONE;		771.0 30	
					33'-40': No sample;		766.0 35	
					40'-45': Dk. green limestone; KOKOMO LIMESTONE;		761.0 40	
							756.0 45	
					50'-60': Tan limestone; KOKOMO LIMESTONE;		751.0 50	
							746.0 55	
					60'-78.5': Lt. gray dolomitic limestone; LISTON CREEK LIMESTONE, UNIT A;		741.0 60	BENTONITE PELLETS →

CAMP DRESSER & McKEE

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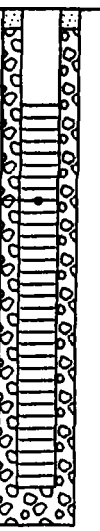
MONITORING WELL DETAIL

LA-107C

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
							731.0 / 70	GRAVEL PACK; Screen - Sched. 40 PVC 2" dia., 0.010" slot
							726.0 / 75	
					Bottom of Exploration @78.5'		721.0 / 80	Bottom of Exploration @78.5'
							716.0 / 85	
							711.0 / 90	
							706.0 / 95	
							701.0 / 100	



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Chicago, Illinois 60606-6306

MONITORING WELL DETAIL

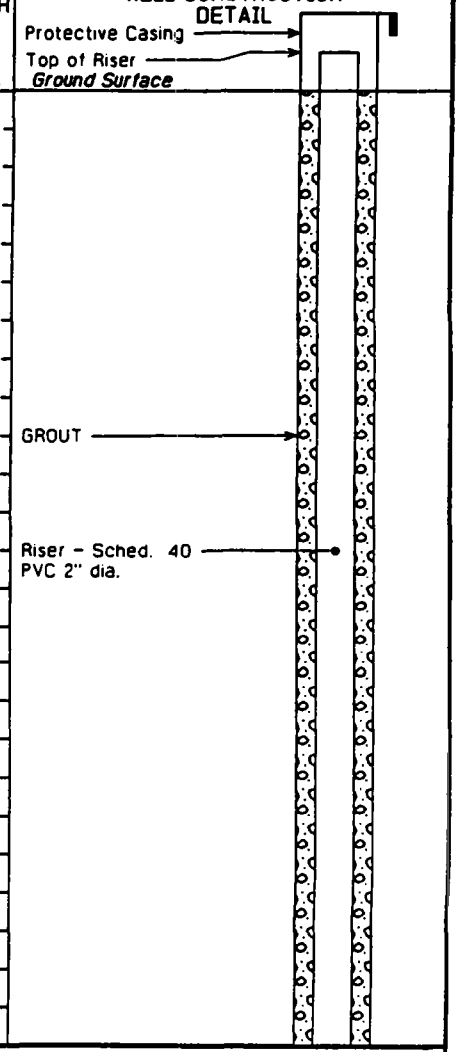
LA-107E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2673-100

Drilling Contractor: EDAC
Surface Elevation (ft.): 799.40
Drilling Method/Rig: HSA/GP1300 ATV
Total Depth (ft.): 126
Drillers: Dan Dreyer, Andrew Morkham
Depth to Initial Water Level (ft. BGS): 83
Drilling Date: **Start** 11/07/95 **End** 11/15/95
Development Method: SUBMERSIBLE PUMP W/SURGE
Field Screening Instrument: OVM
Logged By: Michael Miller
Development Date: **Start** 11/27/95 **End** 11/27/95
Top of Riser Elevation (ft.): 802.46

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)
							799.4 0
AS					0'-3.0': Brown, silty CLAY;		
SS	LA-107E-001		0 ppm	4 3 3 4	3'-5.0': Brown SILT, clayey, moist, loose, fine, gravel;		794.4 5
SS	LA-107E-002			6 3 3 4	8.0'-10.0': No recovery;		789.4 10
SS	LA-107E-003		0 ppm	3 7 9 14	13.0'-15.0': Brown to gray brown SILT, clayey, dry, loose, low plasticity, fine;		784.4 15
AS							
SS	LA-107E-004		0 ppm	6 10 14 20	18.0'-20.0': Dark gray SILT, clayey, moist, fine;		779.4 20

WELL CONSTRUCTION DETAIL



EXPLANATION OF ABBREVIATIONS

DRILLING METHODS:
HSA - Hollow Stem Auger
SSA - Solid Stem Auger
HA - Hand Auger
AR - Air Rotary
DTR - Dual Tube Rotary
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MR - Mud Rotary
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CT - Cable Tool
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SAMPLING TYPES:
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CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample

OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

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CDM

233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL

LA-107E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	ELEV. DEPTH (ft.)
SS	LA-107E-005		0 ppm	9 11 16 22	25.0'-27.0': Gray SILT, fine, moist, loose, low plasticity;	
SS	LA-107E-006		0 ppm	34 100/2"	27.0'-28.0': Gray SILT;	
					28.0': Bedrock; KOKOMO LIMESTONE;	769.4 30
					33'-40': No sample;	764.4 35
					40'-45': Dk. green limestone; KOKOMO LIMESTONE;	759.4 40
						754.4 45
					50'-60': Tan limestone; KOKOMO LIMESTONE;	749.4 50
						744.4 55
					60'-90.0': Lt. gray dolomitic limestone; LISTON CREEK LIMESTONE, UNIT A;	739.4 60

WELL CONSTRUCTION DETAIL

CAMP DRESSER & McKEE
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233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL
LA-107E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					90'-118': Lt. gray limestone;		729.4 / 70	
							724.4 / 75	
							719.4 / 80	
							714.4 / 85	
							709.4 / 90	
					LISTON CREEK LIMESTONE, UNIT B		704.4 / 95	
							699.4 / 100	VERY FINE & FINE SAND →

CAMP DRESSER & McKEE

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MONITORING WELL DETAIL

LA-107E

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					118'-126': Olive dolomite; MISSISSNEWA SHALE;		689.4 / 110	GRAVEL PACK, MEDIUM & COARSE SAND
							684.4 / 115	Screen - Sched. 40 PVC 2" dia., 0.010" slot
							679.4 / 120	
							674.4 / 125	Bottom of Exploration @125.8'
					Bottom of Exploration @126'		669.4 / 130	
							664.4 / 135	
							659.4 / 140	

CAMP DRESSER & McKEE

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MONITORING WELL DETAIL

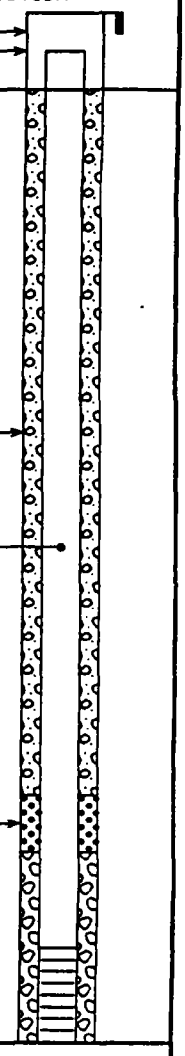
UA-32

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT
Project Name: CONTINENTAL STEEL SUPERFUND SITE
Project Location: KOKOMO, INDIANA
Project Number: 2873-100

Drilling Contractor: SPROWLS
Surface Elevation (ft.): 795.00
Drilling Method/Rig: HSA, MR, AR-INGERSOLL RAND AIRHAMMER
Total Depth (ft.): 35
Drillers: Dan Dreyer, Andrew Morkham
Depth to Initial Water Level (ft. BGS): 17
Drilling Date: **Start** 11/16/95 **End** 11/28/95
Development Method: SUBMERSIBLE PUMP AND SURGE
Field Screening Instrument: OVM
Logged By: Andrea Putscher, Bob Robinson
Development Date: **Start** 11/30/95 **End** 11/30/95
Top of Riser Elevation (ft.): 798.07

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)
					Auger Down 0'-3'		795.0 0
SS	UA-32-001	2'		8 6 6 6	3'-4.0': Brown to dk. brown SILT, some clay and fine sand, trace gravel and concrete waste (Fill);		
					4.0'-4.5': Brown Clay;		790.0 5
					4.5'-5.5': Dark gray to black silt (peat);		
SS	UA-32-002	0.5'		9 11 6 6	5.5'-13.0': Brown silt and very fine sand, little vitrified clay pipe fragments and gravel (FILL);		785.0 10
SS	UA-32-003	1.0'		6 14 20 21	Gray-brown to yellow brown, very fine SAND, silt and gravel; some rust-colored nodules throughout, trace clay, moist;		780.0 15
					18'-27': Light Grey Dolomite; KOKOMO LIMESTONE;		775.0 20

WELL CONSTRUCTION DETAIL



EXPLANATION OF ABBREVIATIONS

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SSA - Solid Stem Auger
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SAMPLING TYPES:
AS - Auger/Grab Sample
CS - California Sampler
BX - 1.6" Rock Core
NX - 2.1" Rock Core
GP - Geoprobe
HP - Hydro Punch
SS - Split Spoon
ST - Shelby Tube
WS - Wash Sample
OTHER:
AGS - Above Ground Surface

REMARKS

Reviewed by: **Date:**

CAMP DRESSER & McKEE
CDM
233 South Wacker Drive, Suite 450
Chicago, Illinois 60606-6306

MONITORING WELL DETAIL

UA-32

Client: INDIANA DEPT. OF ENVIRONMENTAL MANAGEMENT **Project Name:** CONTINENTAL STEEL SUPERFUND SITE

Project Location: KOKOMO, INDIANA **Project Number:** 2673-100

SAMPLE TYPE	SAMPLE NUMBER	SAMPLE RECOVERY	FIELD INSTRUMENT READING	BLOWS PER 6 INCH	MATERIAL DESCRIPTION	GRAPHIC LOG	ELEV. DEPTH (ft.)	WELL CONSTRUCTION DETAIL
					27'-35': Med. Grey Dolomite; KOKOMO LIMESTONE;		765.0 30	GRAVEL PACK; Screen - Sched. 40 PVC 2" dia., 0.010" slot
					Bottom of Exploration @35.0'		760.0 35	Bottom of Exploration @35.0'
							755.0 40	
							750.0 45	
							745.0 50	
							740.0 55	
							735.0 60	

ABB-ES Well Logs

SAMPLER TYPE

S-1	2- or 3-inch I.D. split-spoon sampler
T-1	2- or 3-inch I.D. Shelby tube sampler
SL-1	Sludge sampler
R-1	Nx (2.9-inch O.D.) core

LAB SAMPLE TYPES

C	CLP TCL or TAL analyses
W	CLP Waste Characteration/Incineration parameters analyses
T	Treatability Studies sample
F	Field Laboratory analyses
*	See notes at bottom of boring log

OTHER SYMBOLS

x	Rock core loss
RQD	Rock Quality Designation
PID	Photoionization Detector
Nx	2.9-inch O.D. rock core
HW	3.7-inch O.D. steel casing
Tricone Ream	3 7/8-inch O.D. tricone rotary drilling bit
WoH	Weight of hammer

FRACTURES/DESCRIPTIONS

DESCRIPTION: Angle/Type/Filling, Coating/Surface Planarity/Surface Roughness

Angle: Degrees from horizontal (* indicates multiple angles)

Type:	O	Open	Surface Planarity:	W	Wavy
	T	Tight		PL	Planar
	H	Healed		ST	Stepped
				CP	Curved planar
Filling, Coating:	CL	Open	Surface Roughness:	R	Rough
	Ca	Tight		SR	Tight
	Fe	Healed		S	Smooth
	C	Clean		SLK	Slickensides
	Petro	Petroleum			

"-" indicates not applicable

NOTES

1. Annular fill may include cement and/or natural soil backfill not listed in the header. Refer to well construction diagram for presence and location of these annular materials.
2. Elevation in the header refers to ground surface or water elevation (as noted on each log).
3. Measuring point refers to the top of the solid riser (for wells only).
4. Split-spoons were 2 feet in length.
5. Water level elevations in wells were measured August 1993.
6. Water level elevations for multi-level monitoring systems were measured during system development unless otherwise indicated.

REFERENCES

Rock-Color Chart, 1984, Geologic Society of America, Boulder, Colorado

Munsell Soil Color Chart, 1992, MacBeth Division of Kollmorgen Instruments Corporation, Baltimore, Maryland

Munsell Soil Color Chart, 1990, MacBeth Division of Kollmorgen Instruments Corporation, Baltimore, Maryland

KEY
BORING AND WELL INSTALLATION LOG
CONTINENTAL STEEL RI/FS
KOKOMO, INDIANA
ABB Environmental Services, Inc.

LITHOLOGY

		Not Available/Water/Undifferentiated Overburden
		Topsoil
		Ashalt/Sludge
		Fill with man-made debris
		Cinders
	GW	Well graded gravels, gravel-sand mixutes, little or no fines
	GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Well graded gravels, gravel-sand mixutes, little or no fines
	SW	Well graded gravels, gravel-sand mixtures, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
	ML	Inorganic silts and very fine sands, silty or clayey fine sands, or clayey silts with slight plasticity
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays
	CH	Inorganic clays of high plasticity
		Weathered dolostone/limestone
		Dolostone/Limestone
		Interpreted contact between geologic formations/units
		Interpreted contact between lithologies within geologic formations/units

NOT IN ORDER OF AGE

WELL CONSTRUCTION

	Solid Riser		Bentonite seals (UA wells only)
	Slotted Riser		Sand pack
	Measurement port		Natural soil backfill
	Pumping port		Bentonite-cement grout
	Inflatable packer (LA well only)		
	Water Level		
	Cement		

LEGEND
BORING AND WELL INSTALLATION LOG
CONTINENTAL STEEL RI/FS
KOKOMO, INDIANA

ARR Environmental Services Inc.

Well Location: Markland/Courtland Avenues		Easting: 796997'	Well No: GA-3'
Project Site: Continental Steel		Northing: 1904659'	Project No: 6802
Drilled: 05/20/93 - 05/20/93		Ground Elevation: 804.20'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.2' to: 6.30'		Borehole Diameter: 8.00"	Total Depth: 21.60'
		Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 6.00' to: 21.00'		Measuring Point: 803.96'	Completion Depth: 21.00'
		Water Level Elevation: 798.3'	Sheet 1 of 1
Annular Fill: Type: Bentonite from: 2.00' to: 4.00'; type: #5 Global Sand from: 4.00' to: 21.00'; type: from: to:		Remarks: Borehole diameter from 4.0 to 21.6 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description
	S-1	6 6 9	1.50/2.00		0	C	Silt, little medium to fine sand, trace coarse sand and organic material, poorly graded, nonplastic, stiff, dry, weak red (10R4/2), FILL (ML)
	S-2	8 6 9 50/4"	1.49/1.80		0	C	Clayey silt, little coarse sand and gravel, rock in tip of spoon, poorly graded, nonplastic, stiff, dry, dark reddish gray (10R4/1) and weak red (10R4/4), FILL (ML)
5	R-1	>10 x	1.30/2.00	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE
	R-2	3	1.60/1.60	0			
	R-3	8 2	4.80/5.00	78			
10		2 1 1					4.0 ft: limestone 4.0-5.0 ft: */0/C,Fe/W/SR 6.7-7.6 ft: 0,90/0/Fe,CL/W/SR 7.6 ft: dolostone 7.6-8.4 ft: 0.80/H,T/Fe/PL,W/SR 7.8-7.9 ft: calcite seam
	R-4	1 0	5.00/5.00	82			Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE
15		0 1 3					9.3-10.0 ft: 85/H/C/W/S 9.9-10.2 ft: minor pitted zone 12.5-12.7 ft: minor pitted zone 16.3-17.4 ft: 0,45,80/T/Fe/PL,W/S
	R-5	1 1	3.80/4.00	80			
20		0 0 1					19.0 ft: 0.60/0/Fe/PL/S 21.4 ft: 50/T/Fe/ST/SR
25							

Lithology / Well

Elevation (ft): 800, 795, 790, 785, 780, 775

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Foster/Leeds Streets east of Main Plant	Easting: 195691'	Well No: UA-32
Project Site: Continental Steel	Northing: 1903986'	Project No: 6202
Drilled: 05/20/93 - 05/24/93	Ground Elevation: 807.82'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.3' to: 17.00'	Borehole Diameter: 8.00"	Total Depth: 34.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 17.00' to: 32.00'	Measuring Point: 807.55'	Completion Depth: 32.00'
	Water Level Elevation: 790.6'	Sheet 1 of 2
Annular Fill: type: Grout from: 0.5' to: 12.00'; type: Bentonite from: 12.00' to: 14.00'; type: #5 Global Sand from: 14.00' to: 32.00'	Remarks: Drove 4 in. casing to 23.0 ft. due to caving. Borehole diameter from 23.0 to 34.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	1 3 6 6 9	1.66/2.00		0	C	Silt, trace organic material and medium to fine sand, poorly graded, nonplastic, stiff, dry, dark reddish gray (2.5YR3/3), FILL (ML) 0.75 ft: Same as above with little clay			
	S-2	9 8 8 8 8	2.00/2.00		0		Silty sand, trace coarse to medium sand, poorly graded, nonplastic, medium dense, dry, dark yellowish brown (10YR4/4) FILL (SM)			805
5	S-3	3 5 5 6 6	2.00/2.00		0	C	Sandy silt, poorly graded, nonplastic, stiff, dry, dark yellowish brown (10YR4/4) FILL (ML)			
	S-4	6 6 5 6 6	1.66/2.00		0		6.0 ft: wet			
	S-5	4 5 6 7 7	1.76/2.00		0	C	Silty fine sand, little coarse to medium sand, trace gravel, well graded, nonplastic, medium dense, wet, dark yellowish brown (10YR4/4) FILL (SM)			800
10	S-6	3 7 12 19	2.00/2.00		0					
	S-7	15 34 53/5"	1.40/1.40		0	C	Sand, medium to fine, poorly graded, nonplastic, dense wet, dark yellowish brown (10YR4/4) GLACIAL SANDS AND GRAVELS (SP)			795
	S-8	50/5"	0.40/0.40		0		Silty clay, little coarse to fine sand, gravel and cobbles, well graded, nonplastic, hard, moist, dark yellowish brown (10YR4/4) GLACIAL SILT AND CLAY (CL)			
15	S-9	17 25 22 20	1.50/2.00		0	C	Sand, coarse to medium, some gravel, poorly graded, nonplastic, dense, wet, dark yellowish brown (10YR4/4) GLACIAL SANDS AND GRAVELS (SP) 17.0 ft: trace gravel			
	S-10	17 25 19 17	1.50/2.00		0		Sand, coarse to medium, some fine sand and gravel, well graded, non-plastic, dense, wet, dark yellowish brown (10YR4/4), with a 1-in silt layer at 18 ft GLACIAL SAND AND GRAVEL (SW)			790
20	S-11	2 10 13 28 30	1.24/2.00		0		Sand and gravel, coarse sand, little fine sand, trace cobbles, rock in tip of spoon, well graded, nonplastic, medium dense, wet, yellowish brown (10YR5/4). GLACIAL SANDS AND GRAVELS (SW)			
	S-12	50/4"	0.58/0.83		0		22.0 ft: little silt and broken rock, very dense, light yellowish brown (10YR6/4)			
	R-1	4 x	1.00/1.20	25			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted. KOKOMO LIMESTONE			785
	R-2	>10 6 4 0 4	5.00/5.00	33						
25							22.0-22.8 ft: 0.90/T/Fe/PL/S 24.0-26.9 ft: 80,90/T/Fe/W/SR			780
	R-3	0	5.00/5.00	80			28.2-29.0 ft: 90/0/CL/W/SR significant clay buildup			

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Foster/Leeds Streets east of Main Plant	Easting: 195691'	Well No: UA-02
Project Site: Continental Steel	Northing: 1903986'	Project No: 6802
Drilled: 05/20/93 - 05/24/93	Ground Elevation: 807.82'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.3' to: 17.00'	Borenole Diameter: 8.00"	Total Depth: 34.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 17.00' to: 32.00'	Measuring Point: 807.55'	Completion Depth: 32.00'
	Water Level Elevation: 790.6'	Sheet 2 of 2
Annular Fill: type: Grout from: .30' to: 12.00' type: Bentonite from: 12.00' to: 14.00' type: #5 Global Sand from: 14.00' to: 32.00'	Remarks: Drove 4 in. casing to 23.0 ft. due to caving. Borenole diameter from 23.0 to 34.0 ft. is 2.9 in.	

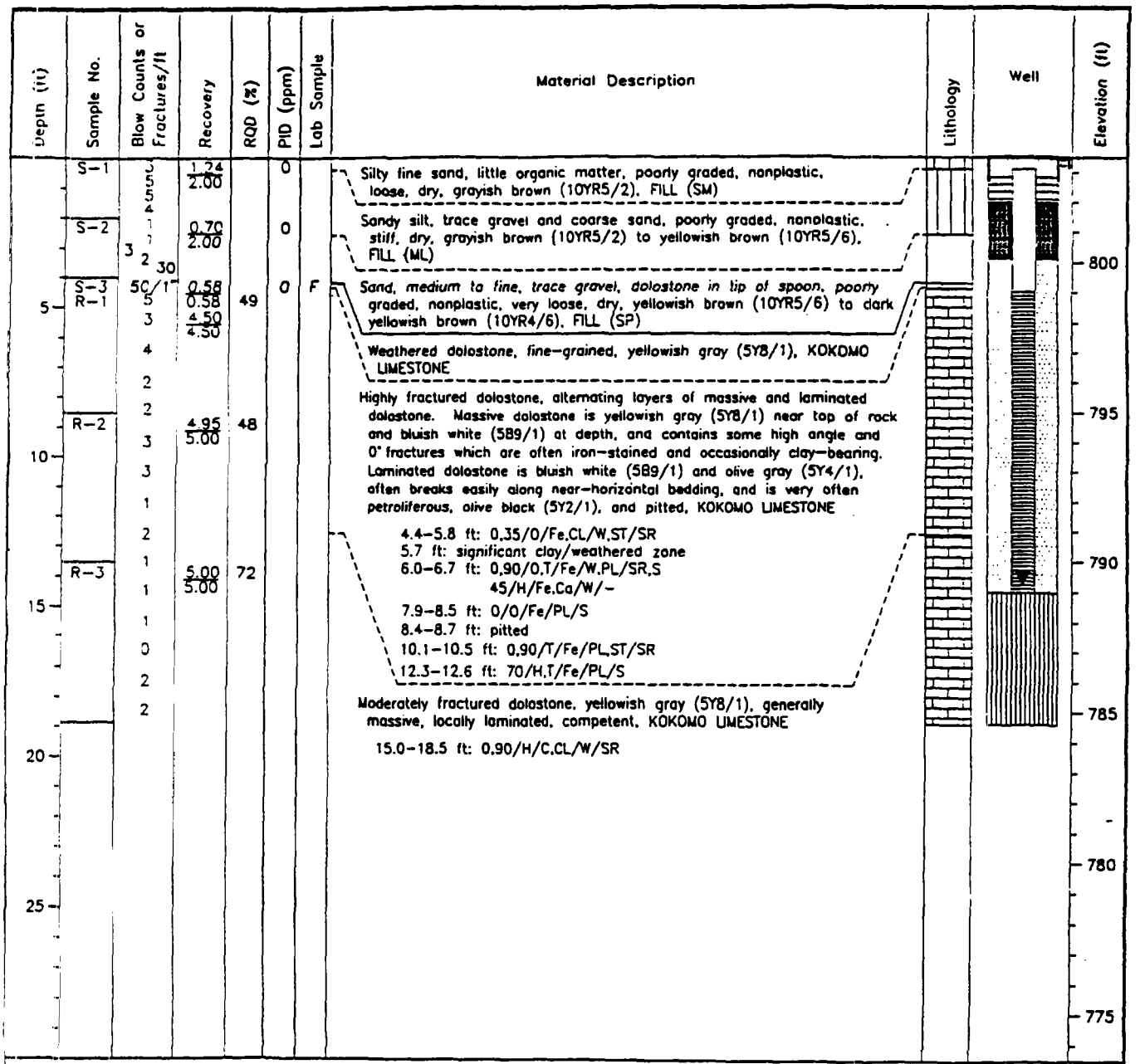
Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	R-3 (cont.)	0 0 2 0	5.00 5.00	80			Moderately fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE 32.6-33.0 ft: 75,90/H/-/W/-			
35										775
										770
40										
										765
45										
										760
50										
										755
55										
										750

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Harrison Drive adjacent to Markland Avenue Quarry	Easting: 196314'		Well No: UA-03
Project Site: Continental Steel	Northing: 1905522'		Project No: 6302
Drilled: 05/17/93 - 05/17/93	Ground Elevation: 803.50'		Datum: Mean Sea Level
Drilling Method: HW Casing/Nx Rock Core	Contractor: Burlington		Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.4' to: 4.50'	Borehole Diameter: 4.50"		Total Depth: 18.90'
	Logged By: K. Hewitt		Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 4.50' to: 14.50'	Measuring Point: 803.14'		Completion Depth: 14.50'
	Water Level Elevation: 789.38'		Sheet 1 of 1
Annular Fill: type: Bentonite from: 1.50' to: 3.40'	Remarks: Borehole diameter from 4.4 to 14.5 ft. is 3.9 in. and from 14.5 to 18.9 ft. is 2.9 in.		
type: #5 Global Sand from: 3.40' to: 14.50'			
type: from: to:			



NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Brandon Street adjacent Markland Avenue Quarry	Easting: 195767'	Well No: UA-04
Project Site: Continental Steel	Northing: 1904755'	Project No: 6802
Drilled 05/05/93 - 05/06/93	Ground Elevation: 805.61'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.2' to: 3.20'	Borehole Diameter: 8.00"	Total Depth: 17.20'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 3.20' to: 13.20'	Measuring Point: 805.39'	Completion Depth: 13.20'
	Water Level Elevation: 797.34'	Sheet 1 of 1
Annular Fill: type: Peltonite Pressed Pellets from: 1.00' to: 2.20'; type: #5 Global Sand from: 2.20' to: 13.20'; type: from: to:	Remarks: Borehole diameter from 4.5 to 17.2 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description
	S-1	1 1 4 2	0.50 / 2.00		0		Sand and clay, medium to fine sand, some topsoil and gravel, firm, moist, moderate brown (5YR4/4), FILL (SC)
	S-2	1 2 3 4	1.00 / 2.00		0		Sandy clay, fine, some silt, firm, moist, moderate brown (5YR4/4) becoming moderate yellow brown (10YR5/4), FILL (CL)
	S-3	3 19 30	1.35		0	F	
5	R-1	50/4"	1.80 / 0.24 / 0.70	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. *Massive dolostone is yellowish gray (5Y8/1) near top of rock* and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. *Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1),* often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE 4.5-6.5 ft: */0/C/W/S 7.6-8.4 ft: 0/0/CL,Fe/W/SR faulted and weathered 8.7-9.3 ft: 90/H,I/Fe/W/SR 9.0 ft: 0/I/Fe/W/SR 9.7-12.5 ft: 90/H,I/Fe/W/SR
	R-2	5 x 1 3	3.47 / 5.70	19			
10		3 x x					
	R-3	0 0 0 0 0	4.90 / 5.00	90			Moderately fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE
15							
20							
25							

Lithology / Well

Elevation (ft): 805, 800, 795, 790, 785, 780

NOTE: *Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.*
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Brandon Street adjacent Markland Avenue Quarry	Easting: 195773'	Well No: UA-03
Project Site: Continental Steel	Northing: 1905384'	Project No: 6202
Drilled: 05/04/93 - 05/05/93	Ground Elevation: 800.05'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.2' to: 3.50'	Borehole Diameter: 8.00"	Total Depth: 23.50'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 3.50' to: 18.50'	Measuring Point: 799.87'	Completion Depth: 18.50'
	Water Level Elevation: 790.5'	Sheet 1 of 1
Annular Fill: type: Bentonite from: 1.00' to: 2.50'; type: #5 Global Sand from: 2.50' to: 19.20'; type: from: to:	Remarks: Borehole diameter from 4.0 to 18.5 ft. is 3.9 in. and from 18.5 to 23.5 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	1 2 5 8	1.10/2.00		0		Silty sand, fine, trace organic material, poorly graded, nonplastic, loose, dry, black (N2.5), FILL (SM)			
	S-2	1 3 4 5	1.24/2.00		0		Silty clay, trace to little fine sand, trace wood fragments, poorly graded, slightly plastic, firm, dry, light olive brown (2.5Y5/3), FILL (CL)			
	S-3	50/5.5"	0.50/0.50		0		4.0 ft: broken rock in tip of spoon			
5	R-1	6	0.49/0.70	0			Weathered dolostone, laminated, yellowish gray (5Y8/1), KOKOMO LIMESTONE			795
	R-2	8	1.00/1.30	27			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			
	R-3	2 0	1.50/1.70	76						
	R-4	4	1.29/1.70	0						
10	R-5	4 4 8	2.80/3.60	53						790
		0					4.5-6.3 ft: 0,90/0,T/Fe,CL/PL,W/S,SR 8.2-9.8 ft: 0,30,85/T,H/Fe/W,ST/SR 10.3-10.8 ft: 0,90/H/Fe/PL/- 10.8-11.9 ft: */T,O/Fe/PL/S			
	R-6	0 0 2	4.75/5.00	84	.04		Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			
15		0 1					12.3-18.5 ft: petroliferous and pitted 14.6-15.6 ft: 85/H,T/C/PL/S			785
	R-7	1 0	5.00/5.00	100			18.5-19.2 ft: 85/T/C/PL/SR			
20		0 0 0 0					Slightly fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE 21.3-22.7 ft: petroliferous and pitted			780
25										775

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Lindsey Street		Easting: 195055'	Well No: UA-06
Project Site: Continental Steel		Northing: 1905330'	Project No: 6802
Drilled: 05/06/93 - 05/06/93		Ground Elevation: 796.21'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.2' to: 6.50'		Borehole Diameter: 8.00"	Total Depth: 18.50'
		Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .125" dia: 2.00" from: 6.50' to: 16.50'		Measuring Point: 795.97'	Completion Depth: 16.50'
		Water Level Elevation: 786.01'	Sheet 1 of 1
Annular Fill: type: Bentonite from: 2.50' to: 4.50'; type: #3 Global Sand from: 4.50' to: 17.00'; type: from: to:		Remarks: Borehole diameter from 5.0 to 16.5 ft. is 3.9 in. and from 16.5 to 18.5 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Elevation (ft)
							ASPHALT	
	S-1	1 3 4 6	1.40 2.00		1	F	Silty clay, little fine sand, trace coarse sand and gravel at 2.7 ft, poorly graded, slightly plastic to nonplastic, firm, moist, brown (7.5YR5/3) to (7.5YR4/3), FILL (CL)	795
	S-2	30 50	1.00 1.00		0	F	3.0 ft: hard, rock in tip of spoon	
5							Weathered dolostone, fine-grained, olive gray (5Y4/1), KOKOMO LIMESTONE	
	R-1	3 1	2.49 2.60	73			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE	790
	R-2	2 4	5.00 5.00	84				
10		1 0 2					6 ft: gray with brown and black staining 6.4 ft: 0/0/Fe/W/SR 6.9 ft: 0/0/CL/W/SR 9.3-10.0 ft: 0/T/Fe/PL/S	785
	R-3	3 7	4.80 5.00	44			11.0-11.4 ft: 80/H/Ca/W/- 12.3 ft: 0.20/0/CL_Fe/ST/SR 13.2-13.5 ft: 0.90/0/CL_Fe/W/S 13.5-14.5 ft: 0.90/T/Fe/PL_W/S petroliferous and pitted 14.5-17.0 ft: 0.40.85/T/Fe/PL_W/S	
15		3 4 0 1						780
							Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 18.2-18.5 ft: 90/H/Fe/ST/SR petroliferous and pitted	
20								775
25								770

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Lindsey Street		Easting: 195091'	Well No: UA-37
Project Site: Continental Steel		Northing: 1904731'	Project No: 6802
Drilled: 05/05/93 - 05/07/93		Ground Elevation: 798.71'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.2' to: 5.80'		Borehole Diameter: 8.00"	Total Depth: 15.80'
		Logged By: J. Kralik	Checked By: D. Walsh
Screen type: Slotted size: .060" dia: 2.00" from: 5.80' to: 15.80'		Measuring Point: 798.49'	Completion Depth: 15.80'
		Water Level Elevation: 788.23'	Sheet 1 of 1
Annular Fill: type: Peltonite Pressed Pellets from: 1.00' to: 4.80' type: #3 Silica Sand from: 4.80' to: 15.80' type: from: to:		Remarks: Borehole diameter from 6.5 to 17.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	3 3	1.00 1.00		0		Topsoil, damp, brownish black (5YR2/1), FILL			
	S-2	10 7	1.00 1.00		0		Clay, some gravel, some slag and organic debris, limestone fragments at depth, very stiff, damp, moderate brown (5YR4/4) black staining, FILL (CL)			
	S-3	23 9 10 10	1.50 2.00		0	F				795
5	S-4	4 4 6 11	1.50 2.00		0	F				
	S-5	11 29 43 50/3"	1.35 1.80		0	F	Weathered dolostone, some moderate brown (5YR4/4) clay, KOKOMO LIMESTONE			790
	R-1	>10 >10 x x	2.00 4.00	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted. KOKOMO LIMESTONE 8.0-10.0 ft: */O/Fe/W,ST/SR 9.0 ft: chert nodule 12.0-15.8 ft: 0,85/H,T/Petrol/PL,W/S,SR			
10	R-2	8 >10 >10 x	2.20 3.80	0						785
15										780
20										775
25										770

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: South side of Main Plant	Easting: 195093'	Well No: UA-08
Project Site: Continental Steel	Northing: 1902903'	Project No: 6802
Drilled: 05/10/93 - 05/11/93	Ground Elevation: 794.78'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.2' to: 10.00'	Borehole Diameter: 8.00"	Total Depth: 20.50'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 10.00' to: 20.00'	Measuring Point: 798.01'	Completion Depth: 20.00'
	Water Level Elevation: 786.04'	Sheet 1 of 1
Annular Fill: type: Peltonite Pressed Pellets from: 2.00' to: 6.00'; type: #5 Global Sand from: 6.00' to: 20.50'; type: from: to:	Remarks: Borehole diameter from 14.0 to 21.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	6 11 10	1.60 / 2.00		0.1		Topsoil, FILL			
		6					Sand and slag, medium dense, grayish black (N20) to black (N1G), FILL			
	S-2	4 4	1.50 / 2.00		0	F	Sandy clay, fine, some slag, trace gravel, stiff, dry to damp, olive gray (5Y4/1), FILL (CL)			
	S-3	5 2 2	1.50 / 2.00		0					
5		2 6 6					Clay, some fill, sand and gravel, firm, moist to wet, dark yellowish brown (10YR4/2), orange staining, FILL (CL)			790
	S-4	2 6 7	1.60 / 2.00		0					
	S-5	4 4 5	1.60 / 2.00		0		Silt/silty clay, some medium to fine sand, trace gravel, stiff, moist to wet, dark yellowish brown (10YR4/2), orange staining, FILL (CL)			
10	S-6	4 6 8	1.60 / 2.00		0					785
	S-7	24 14 25 33	0.60 / 2.00		1.5		Clay, with limestone fragments, dark yellowish brown (10YR4/2), weathered dolostone, KOKOMO LIMESTONE			
	R-1	x 3 x 5 x 1 0	3.51 / 6.50	34			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			
15							14.5-18.7 ft: sparsely petroliferous, trace pitting 14.9-16.0 ft: 0,50,90/T/C,Petrol/W/SR			780
20							Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 18.7-18.9 ft: sparsely petroliferous, trace pitting			775
25										770
										765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: South side of Main Plant	Easting: 194406'	Well No: JA-09
Project Site: Continental Steel	Northing: 1902898'	Project No: 6802
Drilled: 05/07/93 - 05/10/93	Ground Elevation: 791.74'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -2.9' to: 10.00'	Borehole Diameter: 10.00"	Total Depth: 20.40'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 10.00' to: 20.00'	Measuring Point: 794.62'	Completion Depth: 20.00'
	Water Level Elevation: 780.12'	Sheet 1 of 1
Annular Fill: type: Grout from: 2.00' to: 6.00'; type: Bentonite from: 6.00' to: 8.00'; type: #5 Global Sand from: 8.00' to: 20.00'	Remarks: Drove 4 in. casing to 17.5 ft. due to caving. Borehole diameter from 12.0 to 20.0 ft. is 3.9 in. and from 20.0 to 20.4 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description
	S-1	1 3 4 4	1.50/2.00		0		Scale, brick fragments, shiny, loose, moist, black (N2.5), FILL
	S-2	7 9 5 5	1.34/2.00		0		Same as above, medium dense, with slag
5	S-3	1 1 1 3	1.24/2.00		1	F	Silty clay, little coarse to fine sand, poorly graded, slightly plastic, soft, moist, reddish brown (5YR5/3), FILL (CL)
	S-4	3 2 1 3	1.16/2.00		0		
	S-5	WOR 2 3 3	1.66/2.00		0		Silt, little fine sand, poorly graded, nonplastic, firm, moist, very dense, gray (5YR3/1), FILL (ML)
10	S-6	5 16 50/5"	1.16/1.40		1	F	Silty sand, medium to fine, little coarse sand, poorly graded, nonplastic, loose, dry, very dark gray (5YR3/1), ALLUVIAL DEPOSITS (SM)
	S-7	46/3"	0.25/0.25	0	1		Gravelly sand, medium to fine, little coarse sand, rock in tip of spoon, well graded, nonplastic, dense, moist, reddish brown (5YR5/3), ALLUVIAL DEPOSITS (SW)
	R-1	>10 5	2.72/4.00				Weathered dolostone, yellow gray (5YB/1), KOKOMO LIMESTONE
15		x x					Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0 fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE
	R-2	0 0 2 0	4.18/4.40	88			12.0-14.0 ft: 0.90/0/Fe,CL/W/S
20							Moderately fractured dolostone, yellowisn gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE
							16.3-17.5 ft: sparsely petroliferous
							18.1-18.5 ft: 90/T/C/W/SR
25							

Lithology / Well / Elevation (ft): 790, 785, 780, 775, 770, 765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: South side of Main Plant	Easting: 193728'	Well No: UA-10
Project Site: Continental Steel	Northing: 1902665'	Project No: 6202
Drilled: 05/11/93 - 05/11/93	Ground Elevation: 790.87'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.0' to: 10.80'	Borehole Diameter: 8.00"	Total Depth: 27.50'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 10.80' to: 25.80'	Measuring Point: 793.82'	Completion Depth: 25.80'
	Water Level Elevation: 780.61'	Sheet 1 of 1
Annular Fill: type: Grout from: 1.00' to: 6.80'; type: Peltonite Pressed Pellets from: 6.80' to: 8.80'; type: #5 Global Sand from: 8.80' to: 27.50'	Remarks: Borehole diameter from 16.0 to 27.5 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	4 7 6 6	1.50/2.00		0		Slag and various debris, mostly sand, some grayish black clay and gravel, trace silt, medium dense, dry to damp, black, FILL			790
	S-2	6 7 5 23	1.00/2.00		0.2	F				
	S-3	2 4 3 2	1.00/2.00		0.2					
5							Clay, some silt and debris, firm, moist to wet, dark gray (N30) to dark brown (5YR2/2) with orange staining, FILL (CL)			785
	S-4	3 2 1 1	1.00/2.00		0					
	S-5	2 2 3 4	1.50/2.00		0					
10	S-6	2 3 6 12	1.50/2.00		0		Silt/silty sand/sandy silt, some orange-stained medium to fine sand and gravel, wet, dark gray (N30) to pinkish gray (5YR8/1), ALLUVIAL DEPOSITS (SM)			780
	S-7	10 17 20 20	0.50/2.00		0		Weathered dolostone, light yellowish brown (10YR5/2), some moderate yellow brown (10YR5/4) clay and silty clay, dry to wet, KOKOMO LIMESTONE			
	S-8	7 20 13 21	1.50/2.00		0.4					
15										775
	R-1	2 2 0 3 0 2	5.39/6.50	45			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted. KOKOMO LIMESTONE 16.0-17.2 ft: 0/0,T/C/PL/S 17.3-17.6 ft: 90/T/C/PL/S 18.9-19.2 ft: 0.50/T/CL/W/S,SR 21.1-21.3 ft: 0.90/T/C/CP/S 22.3-22.5 ft: 0/T/C/ST/SR			
20										770
	R-2	x x 1 x 2 0	1.90/5.00	26						
25							Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent to Main Plant		Easting: 193934'	Well No: JA-11
Project Site: Continental Steel		Northing: 1904265'	Project No: 6802
Drilled: 05/13/93 - 05/13/93		Ground Elevation: 793.47'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC	dia: 2.00" from: 0.2' to: 14.00'	Borehole Diameter: 8.00"	Total Depth: 30.00'
		Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010"	dia: 2.00" from: 14.00' to: 29.00'	Measuring Point: 793.23'	Completion Depth: 29.00'
		Water Level Elevation: 782.74'	Sheet 1 of 1
Annular Fill: type: Grout type: Bentonite type: #5 Global Sand	from: 1.00' to: 10.00' from: 10.00' to: 12.00' from: 12.00' to: 30.00'	Remarks: Borehole diameter from 18.0 to 30.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	8 8 12	1.00/2.00		0		Topsoil, clay and slag, some coarse to fine sand, gravel and silt, trace plant material, loose to very dense, dry to wet, brownish black (5YR2/1) to brownish gray (5YR4/1), some light brown (5YR5/6). FILL			
	S-2	50/4"	0.30/0.30		4					
	S-3	5 5 3 2	0.60/2.00		2					790
5	S-4	WOH 3 3 2	0.30/2.00		3.6	F				
	S-5	WOH 2 2 4	2.00/2.00		0.4					785
10	S-6	8 7 7 8	1.30/2.00		0.1		Silty clay/silt, some fine sand, trace plant material, firm to stiff, damp to dry, olive gray (5Y4/1), FILL (ML)			
	S-7	2 2 3 11	1.30/2.00		0.2					780
	S-8	9 11 9 3	1.50/2.00		0.3	F	Clay, sand, gravel and rock fragments, medium to fine sand, angular gravel, loose to medium dense, wet to saturated, olive gray (5Y4/1) to to light olive gray (5Y5/2), GLACIAL SILTS AND CLAYS (GC)			
15	S-9	5 5 4 50/5"	0.90/0.90		6.8	F	Clay, sand and angular dolostone/limestone fragments, odor present, weathered dolostone, KOKOMO LIMESTONE			
	R-1	2 4 0 0	3.60/4.00	43			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			775
20	R-2	3 5 0 3 0 x 0	6.40/8.00	34			18.0-18.8 ft: 0/O,T/Ca,Fe/PL/S 19.0-19.5 ft: */O/Fe/W/SR 19.6 ft: 90/T/C/W/SR 20.7-23.8 ft: pitted 22.0-23.7 ft: 0,90/T/C/W/SR 25.3-25.8 ft: 90/T,H/Fe,CL/W/SR 27.3-27.8 ft: pitted 28.8 ft: 60/T/CL/W/SR			770
25										765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent to Main Plant	Easting: 193740'	Well No: UA-12
Project Site: Continental Steel	Northing: 1903421'	Project No: 6802
Drilled: 05/13/93 - 05/14/93	Ground Elevation: 792.40'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.3' to: 34.00'	Borehole Diameter: 8.00"	Total Depth: 48.70'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .125" dia: 2.00" from: 34.00' to: 44.00'	Measuring Point: 792.08'	Completion Depth: 44.00'
	Water Level Elevation: 778.92'	Sheet 1 of 2
Annular Fill: type: Grout from: 0.6' to: 29.00'; type: Bentonite from: 29.00' to: 32.00'; type: #3 Global Sand from: 32.00' to: 48.00'	Remarks: Borehole diameter from 35.6 to 48.7 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	17 27 10	1.30 / 2.00		1.5		Sand, medium to fine, little coarse sand and gravel, well graded, nonplastic, dense, dry, dusky red (2.5YR3/2) to very dark gray (3/N3), FILL (SP)			
	S-2	7 2 2 3 /12"	1.00 / 2.00		2		Sand, medium to fine, little silt and scale, trace coarse sand, poorly graded, nonplastic, medium dense, dry, yellowish red (5YR5/8) to very dark gray (3/N3), FILL (SP)			790
5	S-3	2 2 3 4	0.70 / 2.00		1		Silt, little medium to fine sand, trace coarse sand and gravel, poorly graded, nonplastic, firm, dry, yellowish red (5YR5/8), dark reddish brown (5YR3/3) and black (2.5N2.5), FILL (ML)			
	S-4	2 5 8 7	0.90 / 2.00		0.4		4.0 ft: Clayey silt, little coarse to medium sand, poorly graded, slightly plastic, firm, moist, strong brown (7.5YR4/6), FILL (ML) 6.0 ft: Same as above, brown (7.5YR4/4)			785
	S-5	2 5 8 4	1.40 / 2.00		0.5		8.3 ft: Clayey silt, little coarse to fine sand, poorly graded, slightly plastic, stiff, moist, yellowish brown (10YR5/4), FILL (ML)			
10	S-6	3 6 11 17	1.80 / 2.00		0.5		Sand, coarse to fine, little silt, little to trace gravel and dolostone fragments, poorly graded, nonplastic, medium dense, moist, brown (10YR4/3), FILL (SP)			
	S-7	8 16 19 12	1.40 / 2.00		0.4		Silty clay, trace coarse sand, poorly graded, slightly plastic, stiff, moist, dark yellowish brown (10YR4/4), FILL (CL)			780
	S-8	10 12 13 14	1.40 / 2.00		0.5		Sandy silt, fine, little coarse to medium sand, trace gravel and clay, poorly graded, nonplastic, very stiff, moist, dark yellowish brown (10YR4/6), GLACIAL SILTS AND CLAYS (SM) 12.0 ft: hard, dark grayish brown (10YR4/2)			
15	S-9	10 26 18 20	1.60 / 2.00		0		Silty clay, little to trace gravel, limestone fragments and coarse to medium sand, poorly graded, nonplastic, very stiff, moist, dark yellowish brown (10YR4/4 to 10YR4/6), GLACIAL SILTS AND CLAYS (CL)			775
	S-10	7 16 14 20	1.40 / 2.00		3		16.0 ft: very stiff to hard			
20	S-11	9 10 15 30	1.30 / 2.00		1					
	S-12	11 11 16 25	1.40 / 2.00		1					770
	S-13	11 15 30 48	1.40 / 2.00		0.5					
25	S-14	7 11 17 20	1.50 / 2.00		1		26.0-26.2 ft: Silty fine sand, little coarse sand, trace gravel, well graded, nonplastic, medium dense, wet			765
	S-15	7 13 18 20	1.50 / 2.00		0.4					

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent to Main Plant		Easting: 193740'	Well No: JA-12
Project Site: Continental Steel		Northing: 1903421'	Project No: 6802
Drilled: 05/13/93 - 05/14/93		Ground Elevation: 792.40'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.3' to: 34.00'		Borehole Diameter: 8.00"	Total Depth: 48.70'
		Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .125" dia: 2.00" from: 34.00' to: 44.00'		Measuring Point: 792.08'	Completion Depth: 44.00'
		Water Level Elevation: 778.92'	Sheet 2 of 2
Annular Fill:		Remarks: Borehole diameter from 35.6 to 48.7 ft. is 2.9 in.	
type: Grout	from: to: 29.00'		
type: Bentonite	from: 29.00' to: 32.00'		
type: #3 Global Sand	from: 32.00' to: 48.00'		

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-16	6 10 12 12	1.50 / 2.00		0.5		30.2 ft: very fine sand lens 30.8 ft: very fine sand lens			
	S-17	4 3 5 6	1.80 / 2.00		0.8					760
35	S-18	4 23 50/1"	1.10 / 1.10		1.5	F	Silt, some medium to fine sand, trace fine gravel and clay, poorly graded, nonplastic, stiff, moist, dark yellowish brown (10YR4/4 to 10YR4/6), GLACIAL SILTS AND CLAYS (ML)			
	R-1	>10 >10	1.59 / 3.40	0	0		34.0 ft: Silt, little fine sand, trace medium sand, poorly graded, nonplastic, soft, wet, light gray (10YR7/1), GLACIAL SILTS AND CLAYS (ML) Weathered dolostone, tan to gray, fine-grained, laminated, KOKOMO LIMESTONE			755
40	R-2	>10	0.90 / 5.00	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted. KOKOMO LIMESTONE 35.6-40.0 ft: 0,90/T,0/C/PL,W/S			750
45	R-3	0 0 0 0 0	4.70 / 4.70	100			Slightly fractured dolostone, bluish white (5B9/1) and yellowish gray (5Y8/1), mottled, fossiliferous, trace pitting, LISTON CREEK, UNIT A			745
50										740
55										735

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent to Main Plant		Easting: 193609'	Well No. UA-13
Project Site: Continental Steel		Northing: 1903074'	Project No: 6802
Drilled: 05/12/93 - 05/12/93		Ground Elevation: 794.17'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.2' to: 22.00'		Borehole Diameter: 8.00"	Total Depth: 34.70'
		Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 22.00' to: 32.00'		Measuring Point: 793.96'	Completion Depth: 32.00'
		Water Level Elevation: 781.06'	Sheet 1 of 2
Annular Fill: type: Grout from: 1.00' to: 18.00' type: Peltonite Pressed Pellets from: 18.00' to: 20.00' type: #5 Global Sand from: 20.00' to: 34.70'		Remarks: Borehole diameter from 22.5 to 34.7 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	20 50/4"	0.50 0.80		0.8		Slag and fill, medium to fine sand and gravel, medium dense to very dense, dry to wet, yellowish gray (5Y8/1), grayish black (N70) to black and moderate yellow brown (10YR5/4), some clay layers, FILL			
	S-2	48 50/3"	0.50 0.80		0.4					
	S-3	5 20 28 29	1.50 2.00		0					790
5	S-4	8 10 9 9	0.20 2.00		0.4					
	S-5	11 10 5 2	0.00 2.00							785
10	S-6	4 5 4 10	1.50 2.00		0.1		Silty clay/clay, some fine sand and silt, trace coarse to medium sand and gravel, with weathered dolostone fragments at depth, firm to stiff, moist, dark yellowish brown (10YR4/2) to moderate brown (5YR3/4), FILL (CL)			
	S-7	5 5 6 5	1.50 2.00		0.2					
	S-8	2 1 5 50/4"	0.50 2.00		0.7					780
15	S-9	29 25 50/3"	1.20 1.20		0.2					
	S-10	35 50/4"	0.49 0.80		0.4		Silt, some medium to fine sand, some rounded to subangular gravel, compact, hard, dry, light olive gray (5Y6/1) to olive gray (5Y4/1), GLACIAL SILTS AND CLAYS (ML)			
	S-11	30 48 50/4"	1.30 1.30		0.8	F	Clay, with limestone/dolostone fragments, wet, pale yellowish brown (10YR6/2) to grayish orange (10YR7/4), slight odor, weathered dolostone, KOKOMO LIMESTONE			775
	S-12 R-1	50/2" 8	0.00 0.20 1.00 5.00	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE 22.5-23.4 ft: 0.90/0/C/ST/SR 28.3-29.0 ft: 0/0/CL,Fe/W/SR highly weathered rock, soft, crumbly			770
25		x x x								
	R-2	1 4	3.88 4.80	50						765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent to Main Plant		Easting: 193609'	Well No: UA-13
Project Site: Continental Steel		Northing: 1903075'	Project No: 6802
Drilled: 05/12/93 - 05/12/93		Ground Elevation: 794.17'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC	dia: 2.00" from: 0.2' to: 22.00'	Borehole Diameter: 8.00"	Total Depth: 34.70'
		Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010"	dia: 2.00" from: 22.00' to: 32.00'	Measuring Point: 793.96'	Completion Depth: 32.00'
		Water Level Elevation: 781.06'	Sheet 2 of 2
Annular Fill: type: Grout type: Peltonite Pressed Pellets type: #5 Global Sand	from: 1.00' to: 18.00' from: 18.00' to: 20.00' from: 20.00' to: 34.70'	Remarks: Borehole diameter from 22.5 to 34.7 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	R-2 (cont.)	0	3.88/4.80	50			Slightly fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic. KOKOMO LIMESTONE			
		0								
	R-3	0	2.40/2.40	79			29.8-30.2 ft: 90/H/C/W/-			
		0								
35										760
40										755
45										750
50										745
55										740
										735

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location Park Avenue adjacent to Main Plant	Easting: 193269'	Well No: UA-[illegible]
Project Site: Continental Steel	Northing: 902695'	Project No: 8802
Drilled: 05/11/93 - 05/13/93	Ground Elevation: 797.55'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -2.8' to: 30.60'	Borehole Diameter: 8.00"	Total Depth: 40.60'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .125" dia: 2.00" from: 30.60' to: 40.60'	Measuring Point: 800.40'	Completion Depth: 40.60'
	Water Level Elevation: 780.68'	Sheet 1 of 2
Annular Fill: type: Grout from: 0.5' to: 26.00' type: Bentonite from: 26.00' to: 28.60' type: #3 Global Sand from: 28.60' to: 40.60'	Remarks: Borehole diameter from 34.5 to 40.6 ft. is 3.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	ROD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	4 9 7	1.10 / 2.00		1		Sand, medium to fine, little gravel, trace organic material and brick fragments, poorly graded, nonplastic, medium dense, dry, light yellowish brown (2.5Y6/4) to olive yellow (2.5Y6/6), FILL (SP)			
	S-2	8 2 5	1.30 / 2.00		0.5		Silty sand, medium to fine, little gravel and coarse sand, trace glass and bricks, well graded, nonplastic, very loose to medium dense, dark olive brown (2.5Y3/3), FILL (SM)			795
	S-3	9 14 3	1.10 / 2.00		1		4.0 ft: very dark grayish brown (2.5Y3/2)			
5		2 1/12"								
	S-4	1 4 6	1.20 / 2.00		1.5					
	S-5	15 14 6	1.30 / 2.00		3	F				790
		3 1					Silt, trace coarse sand, poorly graded, nonplastic, stiff, moist, olive gray (5Y4/2), FILL (ML)			
10	S-6	4 4 4	1.40 / 2.00		0		10.0 ft: Sandy silt, fine, little coarse sand, trace gravel, poorly graded, nonplastic, firm, moist, olive gray (5Y4/2), FILL (ML)			
	S-7	4 1 1	1.30 / 2.00		0.5		Silty sand, trace coarse sand, poorly graded, nonplastic, very loose to loose, moist, olive gray (5Y4/2), FILL (SM)			785
		2 4								
	S-8	1 3 3	1.30 / 2.00		0					
15		4								
	S-9	1 1 3	1.10 / 2.00		0.5					
		2								780
	S-10	WoH WoH 3	1.30 / 2.00		0.5		Clayey silt, little fine sand, trace coarse to medium sand, poorly graded, moist, soft, olive gray (5Y4/2), FILL (ML)			
		4								
20	S-11	1 3 6	1.20 / 2.00		0.4		Silty sand, fine, little to some coarse sand and fine gravel, well graded, nonplastic, loose, wet, mottled olive gray (5Y4/2), FILL (SM)			
	S-12	2 2 1/12" 6	1.10 / 2.00		0					775
	S-13	7 27 50/4"	1.30 / 1.30		0.5		Sandy silt, fine, little coarse to medium sand and gravel, poorly graded, nonplastic, firm, wet, gray (5Y5/1), GLACIAL SILTS AND CLAYS (ML)			
25							Silty clay with gravel, poorly graded, nonplastic, firm, saturated, gray (5Y5/1), GLACIAL SILTS AND CLAYS (CL)			
	S-14	49 48 46 41	1.30 / 2.00		0					
	R-1	x x	0.11 / 2.70	0			Sandy silt, fine, little coarse medium sand and gravel, poorly graded, nonplastic, hard, wet, gray (5Y5/1), GLACIAL SILTS AND CLAYS (ML)			770
							Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock			
	R-2	>10	0.80 / 2.30	0						

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent to Main Plant	Easting: 193269'	Well No: UA-14
Project Site: Continental Steel	Northing: 1902695'	Project No: 6802
Drilled: 05/11/93 - 05/13/93	Ground Elevation: 797.55'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -2.8' to: 30.60'	Borehole Diameter: 8.00"	Total Depth: 40.60'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .125" dia: 2.00" from: 30.60' to: 40.60'	Measuring Point: 800.40'	Completion Depth: 40.60'
	Water Level Elevation: 780.68'	Sheet 2 of 2
Annular Fill: type: Grout from: .00' to: 26.00' type: Bentonite from: 26.00' to: 28.60' type: #3 Global Sand from: 28.60' to: 40.60'	Remarks: Borehole diameter from 34.5 to 40.6 ft. is 3.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	R-2 (cont.)	x x	0.80/2.30	0			and bluish white (5B9/1) at depth, and contains some high angle and 0" fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			
	R-3	>10 x	0.40/2.70	0	0					765
35	R-4	3 2	1.50/1.90	0			27.0-34.7 ft: */O/Fe/PL,W/S,SR highly fractured 34.7-36.8 ft: 90/T/C,Fe/W/S,SR			
	R-5	x x 1	1.09/2.30	24						760
40										755
45										750
50										745
55										740

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

Borehole was reamed from 38.5' to 40.6'.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Markland Avenue adjacent to Slag Processing Area	Easting: 190422'	Well No: UA-1S
Project Site: Continental Steel	Northing: 1904605'	Project No: 6802
Drilled: 05/19/93 - 08/09/93	Ground Elevation: 785.31'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATv
Riser: type: PVC dia: 2.00" from: 0.2' to: 15.00'	Borehole Diameter: 8.00"	Total Depth: 35.30'
	Logged By: Kralik/Taylor	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 15.00' to: 35.00'	Measuring Point: 785.08'	Completion Depth: 35.00'
	Water Level Elevation: 763.34'	Sheet 1 of 2
Annular Fill: type: Grout from: 3.00' to: 10.90' type: Bentonite from: 10.90' to: 13.00' type: #5 Global Sand from: 13.00' to: 35.00'	Remarks: Borehole diameter from 6.0 to 35.6 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	13 21 15 23	1.00 / 2.00		0	C	Topsoil, some road gravel and plant debris, brown (5YR3/4), FILL			785
	S-2	12 15 14 17	1.50 / 2.00		0	C	Clay, sand and gravel, coarse to medium sand, coarse to medium gravel, very stiff to hard, brown (5YR3/4) to dark yellow brown (10YR4/2), GLACIAL SILTS AND CLAYS (CL)			
5	S-3	5 11 10 50/5"	1.50 / 1.90		0	C				780
	R-1	>10 >10	1.00 / 2.20	0	0		Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			
	R-2	x 3 1 2	2.60 / 3.00	73	0					
10	R-3	x 2 4 1 1	5.20 / 5.50	75	0		5.3-7.5 ft: */0/C/PL/SR 7.5-8.0 ft: 10/0/Fe/W/SR 9.2 ft: 90/0/Fe/PL/S 9.7 ft: 10,90/0/Fe/PL/S 11.0-11.6 ft: 0/0/Ca/PL/SR,S petroliferous			775
		0 0					Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			
15	R-1b	0 1 3 2	9.50 / 10.00	69			11.6-11.8 ft: 0/0/Ca/PL/SR,S 16.5-20.0 ft: petroliferous and pitted 18.3-19.4 ft: 0,90/0/C/PL/S			770
20		2 0 0 1								765
25		3 0					24.9 ft: 0/0/CL/P/S			760
	R-2b	3 3 0 0	4.60 / 4.60	91			26.3-27.1 ft: 80/0/C/P/S 27.4-27.8 ft: 0/0/CL/P/S Slightly fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE			

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Markland Avenue adjacent to Slag Processing Area	Easting: 190422'	Well No: UA-15
Project Site: Continental Steel	Northing: 1904605'	Project No: 6802
Drilled: 05/19/93 - 08/09/93	Ground Elevation: 785.31'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.2' to: 15.00'	Borehole Diameter: 8.00"	Total Depth: 35.80'
	Logged By: Kralik/Taylor	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 15.00' to: 35.00'	Measuring Point: 785.08'	Completion Depth: 35.00'
	Water Level Elevation: 763.34'	Sheet 2 of 2
Annular Fill: type: Grout from: 3.00' to: 10.90'; type: Bentonite from: 10.90' to: 13.00'; type: #5 Global Sand from: 13.00' to: 35.00'	Remarks: Borehole diameter from 6.0 to 35.6 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
35	R-36	1 0 0 0 0 0	5.00 5.00	100			*Slightly fractured dolostone, KOKOMO LIMESTONE (continued)*			755 750 745 740 735 730
40										
45										
50										
55										

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area	Easting: 190395'	Well No: SA-16
Project Site: Continental Steel	Northing: 1904267'	Project No: 6802
Drilled: 05/14/93 - 05/17/93	Ground Elevation: 795.13'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -2.8' to: 22.00'	Borehole Diameter: 8.00"	Total Depth: 37.00'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 22.00' to: 32.00'	Measuring Point: 797.96'	Completion Depth: 32.00'
	Water Level Elevation: 773.81'	Sheet 1 of 2
Annular Fill: type: Grout from: 1.00' to: 18.00'; type: Bentonite from: 18.00' to: 20.00'; type: #5 Global Sand from: 20.00' to: 37.00'	Remarks: Borehole diameter from 23.5 to 36.7 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	10 14 27	1.50/2.00		0.2		Cinders, coarse to medium-grained, some clay and coarse to fine sand, some various debris, trace to some brick debris and gravel, medium dense to very dense, damp to wet, brownish black (5YR2/1), medium dark brown (7.5YR3/4) to medium brown (5YR4/4) with some black and orange staining, FILL			795
	S-2	17 14 11 15	1.30/2.00		0.4					
5	S-3	50/4"	0.80/0.80		0.3					790
	S-4	50/5"	0.40/0.40		0.4					
	S-5	21 50/3"	1.00/1.00		0.4					
10	S-6	11 8 6 9	0.80/2.00		1.2					785
	S-7	7 29 24 14	0.00/2.00							
	S-8	16 42 50/4"	0.80/1.30		0.2					
15	S-9	26 50/4"	0.80/0.80		0.1					780
	S-10	9 6 4 9	1.10/2.00		0.4		Clay, some sand and silt, stiff, moist, dark yellowish brown (10YR4/2), some orange staining, FILL (CL)			
20	S-11	6 9 13 12	1.40/2.00		0.4	F	Sand, coarse to medium-grained, medium dense, moist to wet, light brownish gray (5YR6/1), ALLUVIAL DEPOSITS (SP)			775
	S-12	12 21 50/4"	0.00/1.30				Sand and dolostone fragments, wet, pale brown (5YR5/2) to brownish gray (5YR4/1), weathered dolostone, KOKOMO LIMESTONE			
	R-1	2 4 3 4 4 3 1	7.48/8.50	48			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			770
25							23.5-26.6 ft: O/T/C/PL/S			

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area	Easting: 190395'	Well No: UA-16
Project Site: Continental Steel	Northing: 1904267'	Project No: 6802
Drilled: 05/14/93 - 05/17/93	Ground Elevation: 795.13'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -2.8' to: 22.00'	Borehole Diameter: 8.00"	Total Depth: 37.00'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 22.00' to: 32.00'	Measuring Point: 797.96'	Completion Depth: 32.00'
	Water Level Elevation: 773.81'	Sheet 2 of 2
Annular Fill: type: Grout from: 1.00' to: 18.00'; type: Bentonite from: 18.00' to: 20.00'; type: #5 Global Sand from: 20.00' to: 37.00'	Remarks: Borehole diameter from 23.5 to 36.7 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	R-1 (cont.)	1	7.48/8.50	48			25.9-30.5 ft: petroliferous and pitted 26.6-28.6 ft: 0,80,90/T/C/PL/S 28.6-30.6 ft: 0/T/C/PL/S			
		x								
	R-2	8	5.00/5.00	64						
		3								
		0					Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			
35		1					32.0-33.1 ft: petroliferous and pitted 32.0-33.3 ft: 0,90/T/C/PL/S			760
		1					36.4-37.0 ft: 80/T/C/PL/S			
40										755
45										750
50										745
55										740

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area	Easting: 189975'	Well No: UA-[illegible]
Project: Site: Continental. Steel	Northing: 1904306'	Project No: 6802
Drilled: 05/18/93 - 05/19/93	Ground Elevation: 786.57'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.0' to: 16.00'	Borehole Diameter: 8.00"	Total Depth: 29.30'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 16.00' to: 26.00'	Measuring Point: 789.60'	Completion Depth: 26.00'
	Water Level Elevation: 773.47'	Sheet 1 of 1
Annular Fill: type: Grout from: 1.00' to: 12.00'; type: Bentonite from: 12.00' to: 14.00'; type: #5 Global Sand from: 14.00' to: 29.30'	Remarks: Borehole diameter from 16.5 to 29.3 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	ROD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	4 20 22 24 27	1.00 / 2.00		0.1		Slag, clay and sand, medium to fine sand, black to brownish black (5YR2/1), some gravel, some brown (5YR2/1) clay, brick and wood debris, medium dense to very dense, damp to moist, FILL			
	S-2	27 30 45 47	1.30 / 2.00		0					785
	S-3	30 16 17 16	0.10 / 2.00		0.8					
5	S-4	5 5 34 19	1.00 / 2.00		0	F	Clay, some coarse to medium sand and silt, some to trace fine gravel, trace slag, very stiff to hard, moist, light olive gray (5Y6/1) to medium yellow brown (10YR5/4) and medium gray (N50), FILL (CL)			780
	S-5	10 9 7 7	1.20 / 2.00		0					
10	S-6	6 6 7 8	1.50 / 2.00		0		Silty clay, trace fine sand, fill and slag, sticky, stiff, moist, olive gray (5Y4/1) to light olive gray (5Y6/1), FILL (CL)			775
	S-7	8 6 6 5	1.30 / 2.00		0		Sand, coarse to fine, some fine gravel, medium dense, wet to saturated, pale red (10R6/2) to dark yellowish brown (10YR6/6), ALLUVIAL DEPOSITS (SP)			
15	S-8	8 10 12 15	1.50 / 2.00		0.2	F				
	S-9	36 50/3"	0.70 / 0.70		0.7		Weathered dolostone fragments, some clay and silt, trace sand, wet, KOKOMO LIMESTONE			770
	R-1	1 3 4 3 1 1 4 3 3	8.91 / 9.00	59			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE 17.5-18.3 ft: 0/T/C/PL/S, sparsely petroliferous 17.5-18.5 ft: 5Y8/1 18.3-18.5 ft: 90/H/Ca/W/S 18.5-bottom of borehole: 5B9/1 18.7-23.9 ft: pitted 19.9 ft: 0/0/CL/PL/SR 20.1-20.3 ft: 90/T/C/PL/S 22.3 ft: 0/0/CL/PL/S 23.4-25.4 ft: 90/T/C/W/SR			765
20										
25	R-2	0 0 0 2	2.60 / 2.80	82			Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 29.0-29.3 ft: 90/T/C/PL/S			760

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Road Quarry	Easting: 189357'	Well No: UA-1B
Project Site: Continental Steel	Northing: 1904583'	Project No: 6802
Drilled: 05/17/93 - 05/19/93	Ground Elevation: 791.99'	Datum: Mean Sea Level
Drilling Method: HW Casing/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.3' to: 34.20'	Borehole Diameter: 4.50"	Total Depth: 55.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 34.20' to: 54.20'	Measuring Point: 795.26'	Completion Depth: 54.20'
	Water Level Elevation: 752.89'	Sheet 1 of 2
Annular Fill: type: Grout from: 0.5' to: 29.20'; type: Bentonite from: 29.20' to: 32.00'; type: #5 Global Sand from: 32.00' to: 54.20'	Remarks: Borehole diameter from 23.0 to 54.0 ft. is 3.9 in. and from 54.0 to 55.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	6 11 11 7	1.20/2.00		0		Sand, medium to fine, little coarse sand and gravel, trace silt, well graded, nonplastic, medium dense, dry, reddish brown (5YR5/3 to 5YR4/3), FILL (SW)			
	S-2	3 3 4	0.40/2.00		0		Silt with fine sand, little clay, cobbles and coarse sand, well graded, nonplastic, stiff, reddish brown (5YR5/3 to 5YR4/3), FILL (SM)			790
	S-3	3 4 4	0.50/2.00		0					
5	S-4	5 4 3	0.40/2.00		0		Sand, fine, little coarse to medium sand, trace silt, poorly graded, nonplastic, loose, wet, yellowish brown (10YR5/4), FILL (SP)			
	S-5	4 7 8	1.30/2.00			F	Silty sand, medium to fine, little coarse sand and gravel, well graded, nonplastic, medium dense, wet, dark gray (4N4) and dark greenish gray (5GY4/1), FILL (SM)			785
	S-6	9 4 2	0.80/2.00				Silty clay, poorly graded, slightly plastic, stiff, moist, reddish yellow (7.5YR6/6) to dark gray (7.5YR4/1), FILL (CL)			
10	S-7	12 5 4	0.50/2.00				Clayey silt, little coarse sand and gravel, poorly graded, plastic, stiff, wet, dark brown (7.5YR3/3), FILL (ML)			
	S-8	3 2 2	0.00/2.00				Sandy silt, fine, little coarse sand and gravel, well graded, nonplastic, firm, wet, yellowish brown (10YR5/4), FILL (SM)			780
	S-9	3 5 4	0.90/2.00				Gravelly sand, medium, little coarse sand, well graded, nonplastic, loose, wet, dark brown (10YR3/3), FILL (SW)			
15	S-10	1/12" 3	1.30/2.00				Silt, little gravel and coarse to medium sand, broken rock and brick in tip of spoon, well graded, nonplastic, firm, wet, dark brown (10YR3/3), FILL (ML)			775
	S-11	5 2 2	0.70/2.00				17.5 ft: Clayey silt, little fine sand, trace coarse sand, poorly graded, plastic, very soft, wet, brown (10YR4/3), FILL (ML)			
20	S-12	24 8 3 4	1.20/2.00		0		18.5 ft: Sandy silt, fine, grading to silty sand, little coarse to medium sand, poorly graded, nonplastic, very soft, wet, brown (10YR4/3), FILL (ML)			
	S-13 R-1	18 11 50/4" 2	0.60/0.80	30	0		19.0 ft: Sandy silt, little clay and fine gravel, broken rock in tip of spoon, poorly graded, nonplastic, stiff, wet, dark gray (10YR4/1), FILL (ML)			770
		5	3.20/4.00				Sand, medium to fine, little silt, dolostone in tip of spoon, poorly graded, nonplastic, loose, wet, grayish brown (10YR5/2), ALLUVIAL DEPOSITS (SP)			
25		8			0		Weathered dolostone, yellowish gray (5Y8/1), KOKOMO LIMESTONE			
		3								
	R-2	5	5.00/5.00	74			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1).			765
		3								
		3								

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition. Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Road Quarry	Easting: 189357'	Well No: UA-1S
Project Site: Continental Steel	Northing: 1904583'	Project No: 6802
Drilled: 05/17/93 - 05/19/93	Ground Elevation: 791.99'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.3' to: 34.20'	Borehole Diameter: 4.50"	Total Depth: 55.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 34.20' to: 54.20'	Measuring Point: 795.26'	Completion Depth: 54.20'
	Water Level Elevation: 752.89'	Sheet 2 of 2
Annular Fill: type: Grout from: 0.5' to: 29.20' type: Bentonite from: 29.20' to: 32.00' type: #5 Global Sand from: 32.00' to: 54.20'	Remarks: Borehole diameter from 23.0 to 54.0 ft. is 3.9 in. and from 54.0 to 55.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description
	R-2 (cont.)	2	5.00/5.00	74			often breaks easily along near-horizontal bedding, and is very often petroliferous and olive black (5Y2/1), with solution cavities, KOKOMO LIMESTONE
		1					23.0-25.0 ft: yellowish gray (5Y8/1)
	R-3	1	5.00/5.00	54			23.0-29.3 ft: 0/0/C/PL/S
		0					24.8-26.9 ft: petroliferous and pitted
		0					25.0-27.0 ft: bluish white (5B9/1)
35		2					27.0 ft: yellowish gray (5Y8/1)
		2					Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE
	R-4	0	5.00/5.00	94			29.3-31.5 ft: 0/T/C/PL/S
		0					30.6-31.2 ft: pitted
		0					35.4-35.8 ft: 85/T/C/PL/SR
40		2					36.7-37.0 ft: 60,90/T/C/CP/R
		0					37.0-39.5 ft: pitted and sparsely petroliferous
	R-5	0	5.00/5.00	76			40.7-40.9 ft: 0/T/C/PL/S
		4					43.6-44.0 ft: 0,90/T/C/PL/S
		2					44.8-45.0 ft: 0,90/T/C/PL/S
45		0					Slightly fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE
		0					47 ft: greenish gray (5GY6/1)
	R-6	0	8.00/8.00	98			
		0					
		0					
50		2					50.8 ft: 0/T/C/PL/S
		0					
		0					
		1					53.8 ft: 85/T/C/PL/S
55		0					

Lithology	Well	Elevation (ft)
		760
		755
		750
		745
		740
		735

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location: Dixon Road Quarry		Easting: 188793'	Well No: UA-19
Project Site: Continental Steel		Northing: 1904366'	Project No: 6802
Drilled: 05/27/93 - 06/02/93		Ground Elevation: 797.47'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.0' to: 55.70'		Borehole Diameter: 8.00"	Total Depth: 78.70'
		Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .060" dia: 2.00" from: 55.70' to: 75.70'		Measuring Point: 800.47'	Completion Depth: 75.70'
		Water Level Elevation: 726.39'	Sheet 1 of 3
Annular Fill: type: Grout from: 0.50' to: 51.00' type: Bentonite from: 51.00' to: 52.80' type: #3 Global Sand from: 52.80' to: 75.70'		Remarks: Borehole diameter from 37.0 to 78.0 ft. is 3.9 in. and from 78.0 to 78.7 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	4 7 6 9	1.50/2.00		6		Gravel, FILL (GW)			
							Silty clay, some sand, gravel and brick fragments, well graded, nonplastic, stiff, dry, pale yellowish brown (10YR3/3 to 10YR3/4), FILL (CL)			
	S-2	16 12 8 14	1.10/2.00		6		Same as above, very stiff with wire bits			795
5	S-3	50/2"	0.45/0.60		6		Slag, well graded, nonplastic, very dense, dry, black (10YR2/1) to very dark brown (10YR 2/2), FILL			
	S-4	5 4 3 2	1.70/2.00		5		Silt, some gravel, poorly graded, nonplastic, firm, moist, very dusky red, (2.5YR2.5/2) to dark reddish brown (2.5YR2.5/3), FILL (ML)			790
	S-5	WOH 3 4	1.50/2.00		6		Silty clay, with weathered brick fragments, poorly graded, plastic, firm, wet, red (2.5YR4/8) to reddish black (2.5YR/N2.5), FILL (CL)			
10	S-6	6 3 5 7	0.90/2.00		6		Slag, with plastic fragments, well graded, nonplastic, loose, dry, black (10YR2/1) to very dark brown (10YR2/2), FILL			
	S-7	4 9 5 5	1.10/2.00		5	F	Silt, with orange plastic, some coarse to medium sand, fine gravel and slag, well graded, nonplastic, stiff to very stiff, dry, very dusky red (2.5YR2.5/1), FILL (ML)			785
	S-8	9 9 10 6	0.90/2.00		6					
15	S-9	5 7 11 20	1.40/2.00		6		16.0 ft: brick fragments, very pale brown (10YR8/4)			
	S-10	9 8 9 9	1.30/2.00		5.5					780
20	S-11	4 3 6 2	1.30/2.00		6		Silt, with coarse to medium sand, poorly graded, nonplastic, firm dense, dry, white (7.5YR8/1), FILL (ML)			
	S-12	1 3 2 3	1.70/2.00		0	F	Silty clay, poorly graded, slightly plastic, soft to stiff, wet, dark reddish brown (2.5YR2.5/3) to red (2.5YR4/8), FILL (CL)			
	S-13	1 1 3 4	2.00/2.00		7		Same as above, with little slag, coarse sand, slightly plastic to nonplastic, very dusky red (2.5YR2.5/2) to dark reddish brown (2.5YR2.5/3)			775
25	S-14	1 1 1 2	2.00/2.00		6.5		26.0 ft: weathered brick fragments, wet			
	S-15	1 1 3 4	2.00/2.00		6					770

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Road Quarry		Easting: 188793'	Well No: UA-19
Project Site: Continental Steel		Northing: 1904366'	Project No: 6802
Drilled: 05/27/93 - 06/02/93		Ground Elevation: 797.47'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.0' to: 55.70'		Borehole Diameter: 8.00"	Total Depth: 78.70'
		Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .060" dia: 2.00" from: 55.70' to: 75.70'		Measuring Point: 800.47'	Completion Depth: 75.70'
		Water Level Elevation: 726.39'	Sheet 2 of 3
Annular Fill: type: Grout from: 0.50' to: 51.00'; type: Bentonite from: 51.00' to: 52.80'; type: #3 Global Sand from: 52.80' to: 75.70'		Remarks: Borehole diameter from 37.0 to 78.0 ft. is 3.9 in. and from 78.0 to 78.7 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-16	1 2 11 15	2.00 2.00		6		Same as above, with wood fragments			
	S-17	7 3 12 20	1.80 2.00		5.5	F	Silt, little coarse sand, gravel and brick fragments, poorly graded, nonplastic, stiff, damp, very pale brown (10YR8/3) to dark brown (7.5YR3/2), FILL (ML)			765
	S-18	40 45 50/5"	1.30 1.40		5		Sand, medium to fine, some coarse sand and gravel, well graded, nonplastic, very dense, damp, yellowish brown (10YR5/8) to dark yellowish brown (10YR4/6), FILL (SW)			
35	S-19	50/2"	0.20		6					
	R-1	2	0.20	0			Weathered dolostone, fractured, yellowish gray (5Y8/1), KOKOMO LIMESTONE			
	R-2	4	0.30 0.60	0						760
		>10	1.10 5.00				Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			
		x								
40		x								
		x								
	R-3	1	5.00 5.00	26	0		36.6-42.0 ft: 0,80,90/0,T/Fe/PL/S,SR 37.4-42.7 ft: pitted 43.0-43.6 ft: 90/T/Fe,CL/PL/SR 44.4-45.0 ft: 0,90/T,0/Fe/W/SR			755
		2								
		4								
45		4								
		0								
	R-4	0	5.00 5.00	100	2		Slightly fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE 47.2 ft: greenish gray (5GY6/1)			750
		0								
50		0								
		0								
		0								
	R-5	0	4.80 5.00	100	1					745
		0								
		0								
55		0								
		0								
	R-6	0	5.60 5.60	93	0					740
		0					Slightly fractured dolostone, bluish white (5B9/1) and yellowish gray (5Y8/1), mottled, fossiliferous, trace pitting, LISTON CREEK, UNIT A			
		0								

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Road Quarry	Easting: 188793'	Well No: UA-19
Project: Site: Continental Steel	Northing: 1904366'	Project No: 6802
Drilled: 05/27/93 - 06/02/93	Ground Elevation: 797.47'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.0' to: 55.70'	Borehole Diameter: 8.00"	Total Depth: 78.70'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .060" dia: 2.00" from: 55.70' to: 75.70'	Measuring Point: 800.47'	Completion Depth: 75.70'
	Water Level Elevation: 726.39'	Sheet 3 of 3
Annular Fill: type: Grout from: 0.50' to: 51.00' type: Bentonite from: 51.00' to: 52.80' type: #3 Global Sand from: 52.80' to: 75.70'	Remarks: Borehole diameter from 37.0 to 78.0 ft. is 3.9 in. and from 78.0 to 78.7 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description
	R-6 (cont.)	2 C C	5.60/5.60	93	0		60.0–60.4 ft: 5,75/H/CL/W/S,SR large quantity of clay Slightly fractured dolostone, LISTON CREEK, UNIT A (continued)
	R-7	C C C C C C C C	5.18/5.40	96	0		
65	R-8	C C C C C C C C	5.20/5.20	100	1		
70	R-9	C C C C C C C C	4.98/5.30	100	0		
75							
80							
85							

Lithology | Well | Elevation (ft): 735, 730, 725, 720, 715, 710

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location: Dixon Road Quarry	Easting: 188567'	Well No: UA-20
Project Site: Continental Steel	Northing: 1903985'	Project No: 6802
Drilled: 05/24/93 - 05/26/93	Ground Elevation: 771.27'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.2' to: 42.00'	Borehole Diameter: 8.00"	Total Depth: 63.20'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 42.00' to: 62.00'	Measuring Point: 774.44'	Completion Depth: 62.00'
	Water Level Elevation: 713.76'	Sheet 1 of 3
Annular Fill: type: Grout from: 0.50' to: 38.00' type: Bentonite from: 38.00' to: 40.00' type: #5 Global Sand from: 40.00' to: 63.20'	Remarks: Borehole diameter from 7.0 to 63.0 ft. is 3.9 in. and from 63.0 to 63.2 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	2 6 7 13	1.40 / 2.00		0	F	Sand, medium to fine, little coarse sand, gravel and silt, trace organic material, well graded, nonplastic, medium dense to dense, dry, yellowish red (5YR5/8) and reddish brown (5YR4/4), FILL (SW)			770
	S-2	6 10 13 16	1.70 / 2.00		0					
5	S-3	6 12 27 30	1.70 / 2.00		0	F				
	S-4	36 50/4"	0.80 / 0.80		0		Weathered dolostone, yellowish gray (5Y8/1), KOKOMO LIMESTONE			765
	R-1	2 2 0 0 0 2	5.27 / 6.20	58			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is olive black (5Y2/1), KOKOMO LIMESTONE			
10							7.0-8.5 ft: 0,70,90/0/Fe/PL/S			760
							12.0 ft: 0/0/Fe/PL/S			
	R-2	5 2 1 2 2	5.00 / 5.00	46			12.0-14.3 ft: 0,90/T/Fe/PL/S			
15							15.1 ft: 0/T/Fe/PL/S			755
							17.0-19.0 ft: 90/0/Fe/PL/SR			
	R-3	2 0 2 0 1	5.00 / 5.00	76			Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			
20										750
	R-4	0 2 1 5 1	4.80 / 5.00	68	0		22.5 ft: light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic			
							22.3 ft: 45/T/C/PL/S			
25							24.5 ft: 0/T/C/PL/S			
							24.6-24.7 ft: 90/H/Ca/PL/S			
							26.1-26.6 ft: 0,35,45/T/C/PL/S			745
	R-5	0 3	5.00 / 5.00	75			Moderately fractured dolostone, bluish white (5B9/1) and yellowish gray (5Y8/1), mottled, fossiliferous, trace pitting, LISTON CREEK, UNIT A			
							29.6-31.0 ft: 90/T/Ca/W/SR			

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Road Quarry	Easting: 188567'	Well No: UA-20
Project Site: Continental Steel	Northing: 1903985'	Project No: 6802
Drilled: 05/24/93 - 05/26/93	Ground Elevation: 771.27'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.2' to: 42.00'	Borehole Diameter: 8.00"	Total Depth: 63.20'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 42.00' to: 62.00'	Measuring Point: 774.44'	Completion Depth: 62.00'
	Water Level Elevation: 713.76'	Sheet 2 of 3
Annular Fill: type: Grout from: 0.50' to: 38.00' type: Bentonite from: 38.00' to: 40.00' type: #5 Global Sand from: 40.00' to: 63.20'	Remarks: Borehole diameter from 7.0 to 63.0 ft. is 3.9 in. and from 63.0 to 63.2 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description
	R-5 (cont.)	1	5.00/5.00	75			Moderately fractured dolostone, LISTON CREEK, UNIT A (continued)
		0					
		0					
	R-6	0	5.00/5.00	95	0		Slightly fractured dolostone, LISTON CREEK, UNIT A
		0					
35		0					
		0					
		2					37.4-37.7 ft: 5,30/0/CL/W/SR
	R-7	0	5.00/5.00	92			
		3					39.1-39.5 ft: 0,90/T/C/ST/SR
40		0					
		0					
		1					42.8 ft: 0/0/CL/W/SR
	R-8	1	5.00/5.00	90	0		43.6-43.8 ft: 0/0/CL/ST/SR
		0					90/H/Ca/W/SR
45		0					
		0					
		1					
	R-9	0	5.00/5.00	100	0		47.9 ft: 0/T/CC/W/SR
		0					
50		0					
		0					
		0					
	R-10	0	5.00/5.00	100	0		
		0					
55		0					
		0					
		0					
	R-11	0	4.50/5.00	78	0		
		2					59.0-59.5 ft: 0,80/0/C/PL/SR,S

Lithology | Well | Elevation (ft): 740, 735, 730, 725, 720, 715

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location: Dixon Road Quarry	Easting: 188567'	Well No: UA-20
Project Site: Continental Steel	Northing: 1903985'	Project No: 6802
Drilled: 05/24/93 - 05/26/93	Ground Elevation: 771.27'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.2' to: 42.00'	Borehole Diameter: 8.00"	Total Depth: 63.20'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 42.00' to: 62.00'	Measuring Point: 774.44'	Completion Depth: 62.00'
	Water Level Elevation: 713.76'	Sheet 3 of 3
Annular Fill: type: Grout from: 0.50' to: 38.00' type: Bentonite from: 38.00' to: 40.00' type: #5 Global Sand from: 40.00' to: 63.20'	Remarks: Borehole diameter from 7.0 to 63.0 ft. is 3.9 in. and from 63.0 to 63.2 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	R-11 (cont.)	0 0 0	4.50/5.00	78	0		Slightly fractured dolostone, LISTON CREEK, UNIT A (continued)			710
65										705
70										700
75										695
80										690
85										685

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Main Plant	Easting: 795194'	Well No: UA-3'
Project: Site: Continental Steel	Northing: 1903450'	Project No: 6802
Drilled: 05/20/93 - 05/21/93	Ground Elevation: 796.51'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.0' to: 10.00'	Borehole Diameter: 8.00"	Total Depth: 22.50'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 10.00' to: 20.00'	Measuring Point: 799.56'	Completion Depth: 20.00'
	Water Level Elevation: 788.59'	Sheet 1 of 1
Annular Fill: type: Grout from: 1.00' to: 6.00'; type: Bentonite from: 6.00' to: 8.00'; type: #5 Global Sand from: 8.00' to: 20.80'	Remarks: Borehole diameter from 12.0 to 22.5 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	12 19 16 20	1.50/2.00		0.4		Topsoil, slag and debris, brown (7.5YR4/2), FILL			795
	S-2	16 11 8 8	1.00/2.00		10	F	Sandy silt, topsoil, slag and debris, some fine sand and gravel, hard dense to dense, dry to moist, FILL			
	S-3	50/4"	0.07/0.30		2.2		Silty clay, trace fine gravel, becoming sandy with depth, soft to hard, moist to damp, olive gray (5Y5/2) to light olive gray (5Y6/2), FILL (CL)			
5	S-4	2 4 4 5	1.50/2.00		0.1					790
	S-5	1 1 1	1.50/2.00		0.1					
10	S-6	17 21 44 50/4"	1.00/1.80		5.4	F	Sand, some slag, dense, saturated, olive gray (5Y5/2) to light olive gray (5Y6/2), FILL (SP)			785
	R-1	5 8 9 3	3.68/4.00	20			Weathered dolostone, KOKOMO LIMESTONE			
15	R-2	3 1 0 3	6.30/6.50	75			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE 12.0-14.0 ft: 0.85/T/Fe/PL,CP/S,SR 14.0-14.6 ft: petroliferous 14.0-15.7 ft: 0.90/T/C/PL/S,SR			780
20		3 3 0 0					Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 18.2-19.0 ft: 75/T/C/PL/SR			775
							Slightly fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE			
25										770

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Markland Avenue Quarry	Easting: 196476'	Well No: UA-22
Project Site: Continental Steel	Northing: 1905061'	Project No: 6802
Drilled: 05/24/93 - 05/28/93	Ground Elevation: 809.68'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.0' to: 14.00'	Borehole Diameter: 8.00"	Total Depth: 72.00'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 14.00' to: 34.00'	Measuring Point: 812.63'	Completion Depth: 34.00'
	Water Level Elevation: 797.21'	Sheet 1 of 3
Annular Fill: type: Grout from: 1.00' to: 10.00'; type: Bentonite from: 10.00' to: 12.00'; type: #5 Global Sand from: 12.00' to: 34.00'	Remarks: UA-22 log is based on UA-22, UA-22A, and UA-22B. UA-22 was terminated at 23.0 ft. due to equipment failure. UA-22A was abandoned at 72.0 ft. due to lost augers. Both boreholes were backfilled with bentonite and/or grout and soil. The well was installed in UA-22B, renamed UA-22.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	50/2"	0.10/0.20		0.2		Slag, coarse to medium-grained, some gravel-sized, with some dusky brown (5YR2/2) clay and silt, wet to damp, brownish black (5YR2/1), FILL.			
	S-2	15 9 4 7	1.50/2.00		1.1	F				
5	S-3	7 50/4"	0.60/0.80		2.6					805
	S-4	6 9 31 50/4"	1.49/1.80		1					
	S-5	31 30 24 47	0.50/2.00		20		8.0 ft: dry to moist			
10	S-6	16 19 18 9	1.00/2.00		1.4	F	10.0 ft: dry to damp			800
	S-7	12 50/4"	0.49/0.80		12		Slag and clay, some coarse to medium sand, trace debris, wet, black (N10) to brownish black (5YR2/1), FILL.			
	S-8	10 14 40 26	0.02/2.00		0.1					
15	S-9	18 12 17 35	0.60/2.00		2.5		16.0 ft: some metal shavings, no clay			795
	S-10	24 50/3"	0.00/0.80		0					
20	S-11	19 37 33 50/3"	1.49/1.80		1.9	F				790
	S-12	17 37 50/1"	0.59/1.10		1.9		*22.5 ft: coarse to medium sand and gravel, very wet*			
	S-13	24 50/4"	0.40/0.80		0					
25	S-14	9 10 14 9	0.50/2.00		1.4		26.0 ft: large chunks of slag, wet to saturated			785
	S-15	8 6 7 7	0.50/2.00		0		28.0 ft: some tan gravel			780

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Markland Avenue Quarry		Easting: 196476'	Well No: UA-22
Project Site: Continental Steel		Northing: 1905061'	Project No: 6802
Drilled: 05/24/93 - 05/28/93		Ground Elevation: 809.68'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.0' to: 14.00'		Borehole Diameter: 8.00"	Total Depth: 72.00'
		Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 14.00' to: 34.00'		Measuring Point: 812.63'	Completion Depth: 34.00'
		Water Level Elevation: 797.21'	Sheet 2 of 3
Annular Fill: type: Grout from: 1.00' to: 10.00'; type: Bentonite from: 10.00' to: 12.00'; type: #5 Global Sand from: 12.00' to: 34.00'		Remarks: UA-22 log is based on UA-22, UA-22A, and UA-22B. UA-22 was terminated at 23.0 ft. due to equipment failure. UA-22A was abandoned at 72.0 ft. due to lost augers. Both boreholes were backfilled with bentonite and/or grout and soil. The well was installed in UA-22B, renamed UA-22.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-16	14 17 26 47	1.00 / 2.00		1		30.0 ft: some medium to fine sand and tan gravel, little coarse sand			
	S-17	31 41 16 20	0.00 / 2.00				32.0 ft: very wet			
	S-18	11 13 29 50/2"	1.49 / 1.70		0		34.0 ft: wet to saturated			
35	S-19	50/4"	0.30 / 0.30		0					775
	S-20	19 18 18 18	1.00 / 2.00		0	F	36.0 ft: saturated			
40	S-21	18 17 11 14	0.00 / 2.00		0					770
	S-22	10 12 6 16	0.50 / 2.00		3.4		42.0 ft: coarse to medium sand and tan gravel, red brick (?) debris			
	S-23	16 21 25 34	1.20 / 2.00		0.3		44.0 ft: some refractory brick debris			
45	S-24	25 35 50/4"	1.29 / 1.80		4.0		46.0 ft: some gray sandy silt			765
	S-25	25 50/4"	0.80 / 0.80		0					
50	S-26	39 42 50/2"	1.20 / 1.70		5.6	F				760
	S-27	19 24 50/5"	0.40 / 1.40		4.0					
	S-28	15 18 17 28	1.00 / 2.00		4.2		54.0 ft: some large chunks of slag			
55	S-29	20 17 15 45	0.50 / 2.00		4.4					755
	S-30	30 50/4"	0.80 / 0.80		4.6	F				
										750

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Markland Avenue Quarry		Easting: 196476'	Well No: UA-22
Project Site: Continental Steel		Northing: 1905061'	Project No: 6802
Drilled: 05/24/93 - 05/28/93		Ground Elevation: 809.68'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.0' to: 14.00'		Borehole Diameter: 8.00"	Total Depth: 72.00'
		Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 14.00' to: 34.00'		Measuring Point: 812.63'	Completion Depth: 34.00'
		Water Level Elevation: 797.21'	Sheet 3 of 3
Annular Fill: type: Grout from: 1.00' to: 10.00'; type: Bentonite from: 10.00' to: 12.00'; type: #5 Global Sand from: 12.00' to: 34.00'		Remarks: UA-22 log is based on UA-22, UA-22A, and UA-22B. UA-22 was terminated at 23.0 ft. due to equipment failure. UA-22A was abandoned at 72.0 ft. due to lost augers. Both boreholes were backfilled with bentonite and/or grout and soil. The well was installed in UA-22B, renamed UA-22.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-31	26 50/4"	0.00/0.80				FILL (continued)			
	S-32	WoH 6 16 25	0.10/2.00		0					
	S-33	15 39 11 12	1.20/2.00		3.2					
65										745
	S-34	9 17 50/2"	0.00/1.70		0					
	S-35	4 50/4"	0.80/0.80		2.4					
70	S-36	50/0"	0.00/0.00		0		Slag, coarse to medium, some brick debris, black and very light gray, FILL			740
75										735
80										730
85										725
										720

NOTE Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Main Plant	Easting: 194784'	Well No: UA-23
Project Site: Continental Steel	Northing: 1903844'	Project No: 6802
Drilled: 05/11/93 - 05/11/93	Ground Elevation: 795.05'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 2.00" from: -3.1' to: 4.00'	Borehole Diameter: 8.00"	Total Depth: 17.20'
	Logged By: K. Hewitt	Checked By: D. Walsh
Screen: type: Slotted size: 010" dia: 2.00" from: 4.00' to: 14.00'	Measuring Point: 798.15'	Completion Depth: 14.00'
	Water Level Elevation: 788.67'	Sheet 1 of 1
Annular Fill: type: Bentonite from: 1.00' to: 3.00'; type: #5 Global Sand from: 3.00' to: 16.00'; type: from: to:	Remarks: Borehole diameter from 8.5 to 17.2 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	8 8 8 8	1.50/2.00		0		Sand, medium to fine, trace gravel, well graded, nonplastic, medium dense, dry, black (N2.5), with silty clay layers from 1.5 to 2.0 ft, FILL (SW)			
	S-2	3 2 2 3	1.60/2.00		0	FI	Clayey silt, poorly graded, nonplastic, soft, moist, olive brown (2.5Y4/3), FILL (ML)			
	S-3	1 1 3 4	1.30/2.00		0		Silty sand, fine, little clay, poorly graded, nonplastic, very loose, moist, mottled olive brown (2.5Y4/3), FILL (SM)			
5	S-4	6 9 11 27	1.50/2.00		0	FI	4.7 ft: Silty sand, fine, trace medium sand, poorly graded, nonplastic, very loose, moist, olive brown (2.5Y4/3), FILL (SM)			
	S-5	50/5"	0.50/0.50		0		6.0 ft: Silty sand, fine, little coarse to medium sand and gravel, well graded, nonplastic, medium dense, wet, olive brown (2.5Y4/3), FILL (SM)			
	R-1	3 5 x x	2.20/3.70	8			Weathered dolostone, fine-grained, laminated, yellowish gray (5Y8/1), KOKOMO LIMESTONE			
10							Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous and olive black (5Y2/1), with solution cavities, KOKOMO LIMESTONE			
	R-2	4 3 1 3 0	4.40/5.00	30			8.5-9.6 ft: 5/O/Fe/W/SR pitted 9.6 ft: 45/H/Fe/ST/SR 12.2-13.2 ft: 0.90/T/Fe,C/PL/S			
15							Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 13.2-14.5 ft: pitted 13.7-14.1 ft: 0.45,90/T,O/Fe/PL/S 15.2-15.8 ft: 0.90/T/Fe/W/SR			
20										
25										

Elevation (ft)
790
785
780
775
770

NOTE: Soil colors are based on Munsell Soil Color Charts, 1992 revised edition.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent to Main Plant		Easting: 193837'	Well No: UA-24
Project Site: Continental Steel		Northing: 1903803'	Project No: 6802
Drilled: 05/13/93 - 05/14/93		Ground Elevation: 793.83'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.1' to: 13.00'		Borehole Diameter: 8.00"	Total Depth: 27.50'
		Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 13.00' to: 23.00'		Measuring Point: 793.69'	Completion Depth: 23.00'
		Water Level Elevation: 782.32'	Sheet 1 of 1
Annular Fill: type: Grout from: 1.00' to: 9.00'; type: Bentonite from: 9.00' to: 11.00'; type: #5 Global Sand from: 11.00' to: 27.50'		Remarks: Borehole diameter from 14.0 to 27.5 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description
	S-1	18 50/5"	0.70 0.90		4.8	F	Coarse to medium sand, clay and dolostone fragments, light gray (N70), brownish gray (5YR4/1) and dark yellowish brown (10YR6/6) with brownish black (5YR2/1) slag, medium dense to very dense, dry to moist, some iron staining, FILL
	S-2	10 9 12 13	1.18 2.00		0		
5	S-3	6 5 7 14	0.80 2.00		1.6	F	
	S-4	26 50/5"	0.70 0.90		1		
	S-5	7 6 2 5	1.50 2.00		0.2		
10	S-6	5 6 7 8	1.00 2.00		0.4		Clay/silty clay, trace fine gravel and carbonized debris, firm to stiff, moist to damp, dark yellowish brown (10YR6/6), some black staining, FILL (CH)
	S-7	4 15 50/5"	0.79 1.40		0.8	F	Clay and weathered dolostone fragments, moist to wet, dark yellowish brown (10YR6/6), odor present, KOKOMO LIMESTONE
	S-8	50/3"	0.20		0		
15	R-1	6 6 10 x	0.20 2.80 3.50	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE 14.0-19.0 ft: 0,40,90/T,O,H/Fe,CL/PL/S,SR 18.0-19.0 ft: petroliferous 19.0-20.0 ft: 0,45/T,O/CL/PL/SR 20.0-22.5 ft: 0/0/Fe/PL/S 22.3 ft: 80/T/Fe/PL/S
	R-2	3 8 8 4	4.80 5.00	14			
20		5					
	R-3	3 0 0 0	4.90 5.00	74			Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 22.6 ft: 0/0/Fe,CL/PL/SR 23.5-27.5 ft: pitted and sparsely petroliferous
25		0 0 2					27.1-27.2 ft: 0,80/T/C/PL/S

Well

Elevation (ft): 790, 785, 780, 775, 770, 765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area	Easting: 190044'	Well No: UA-25
Project Site: Continental Steel	Northing: 1904076'	Project No: 6802
Drilled: 05/17/93 - 05/18/93	Ground Elevation: 789.50'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.0' to: 25.00'	Borehole Diameter: 8.00"	Total Depth: 37.00'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 25.00' to: 35.00'	Measuring Point: 792.51'	Completion Depth: 35.00'
	Water Level Elevation: 771.29'	Sheet 1 of 2
Annular Fill: type: Grout from: 1.00' to: 21.00'; type: Bentonite from: 21.00' to: 23.00'; type: #5 Global Sand from: 23.00' to: 35.50'	Remarks: Borehole diameter from 29.0 to 37.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Elevation (ft)
	S-1	15 18 24 37 45	1.40 / 2.00		0.2		Cinders, coarse to medium-grained, some clay and coarse to medium sand, dense to very dense, moist to dry, moderate brown (5YR3/4) to grayish brown (5YR3/2), some orange staining, FILL	
	S-2	50/2"	0.49 / 0.70		0.6			
5	S-3	25 23 13 11	0.40 / 2.00		0.6			785
	S-4		0.00 / 2.00		0			
	S-5		0.00 / 2.00					
10	S-6	1 WoH WoH 2	2.00 / 2.00		0		Clayey soil, soft, wet, pale brown (5YR5/2), FILL (CL)	780
	S-7	15 16 13 11	0.60 / 2.00		0.6		Cinders, coarse to medium-grained, some clay and sand, brownisn black (5YR2/1) to dusky brown (5YR2/2), FILL	
	S-8	5 1 1 4	2.00 / 2.00		0.1	F	Clay, red brown (5YR5/6) to black, and clayey soil, pale brown (5YR5/2), soft, wet to damp, FILL (CL)	775
	S-9	2 2 2 4	2.00 / 2.00		0			
	S-10	1 1 2 4	2.00 / 2.00		0		Clay, soft to firm, damp to wet, light brown (5YR5/6) to black (N10) becoming dry to damp and moderate reddish brown (10YR4/6) to greenish black (5GY2/1) with depth, FILL (CL)	
20	S-11	1 1 3 5	2.00 / 2.00		0			770
	S-12	2 1 2 4	2.00 / 2.00		0			
	S-13	3 2 3 5	2.00 / 2.00		0			765
25	S-14	5 2 5 6	2.00 / 2.00		0			
	S-15	3 7	0.70 / 1.50		1500	F	Clay, with wood debris and rock fragments, greenish black (5GY2/1), weathered dolostone, KOKOMO LIMESTONE	
	R-1	18 50/.5"	7.40 / 8.00	94			Moderately fractured dolostone	760

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area	Easting: 190044'	Well No: UA-25
Project Site: Continental Steel	Northing: 1904076'	Project No: 6802
Drilled: 05/17/93 - 05/18/93	Ground Elevation: 789.50'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.0' to: 25.00'	Borehole Diameter: 8.00"	Total Depth: 37.00'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 25.00' to: 35.00'	Measuring Point: 792.51'	Completion Depth: 35.00'
	Water Level Elevation: 771.29'	Sheet 2 of 2
Annular Fill: type: Grout from: 1.00' to: 21.00'; type: Bentonite from: 21.00' to: 23.00'; type: #5 Global Sand from: 23.00' to: 35.50'	Remarks: Borehole diameter from 29.0 to 37.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
35	R-1 (cont.)	0 3 4 0 0 0 1	7.40/8.00	94			Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 31.3-31.5 ft: 0/T/C/PL/S 32.3-32.5 ft: 0/T/C/PL/S 36.5 ft: 80/T/C/PL/S			755
40										750
45										745
50										740
55										735
										730

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Main Plant	Easting: '94423'	Well No: UA-26
Project Site: Continental Steel	Northing: 1903237'	Project No: 6802
Drilled: 05/21/93 - 05/24/93	Ground Elevation: 792.64'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -3.4' to: 8.00'	Borehole Diameter: 8.00"	Total Depth: 26.50'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 8.00' to: 18.00'	Measuring Point: 795.99'	Completion Depth: 18.00'
	Water Level Elevation: 784.00'	Sheet 1 of 1
Annular Fill: type: Grout from: 1.00' to: 4.00'; type: Bentonite from: 4.00' to: 6.00'; type: #5 Global Sand from: 6.00' to: 25.90'	Remarks: Borehole diameter from 12.0 to 26.5 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	50/4"	0.30/0.30		0.5		Topsoil and gravel, FILL			
	S-2	8 9 5 7	1.30/2.00		0.4	F	Silty clay/clay/gravely clay, some mecium to fine sand, stiff, damo to moist, olive gray (5Y4/1) to light olive gray (5Y6/1) becoming dark yellowish brown (10YR4/2), FILL (CL)			790
5	S-3	4 5 7 9	1.00/2.00		0.2					
	S-4	5 50/2"	0.60/0.70		0.4	F	Clay, with angular dolostone fragments, dry, dark yellowisn brown (10YR4/2), weathered dolostone, KOKOMO LIMESTONE			785
	S-5	50/3"	0.20/0.20		0.8					
10	S-6	50/2"	0.00/0.20							
	R-1	5 5 x 1	1.80/2.70	13			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			780
15	R-2	10 5 4 3	4.30/4.30	35			12.0 ft: 0,30,85/0/Fe/ST/R 15.0-16.0 ft: 5,35,90/0/Fe/W/SR 16.5-17.0 ft: 5,35,90/0/Fe/P/S 18.0-22.0 ft: 0,90/T/C/PL/SR,SLK at 20.0 ft. 19.4-22.0 ft: petroliferous and pitted			775
	R-3	2 2 2 0 1	6.52/7.50	59			Moderately fractured dolostone, yellowisn gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 22.0-22.9 ft: petroliferous and pitted 23.0-24.0 ft: 50/H/C,Petrol/PL/- 25.8-26.5 ft: pitted			770
20		1 0 0								
25										765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

APPENDIX C-3

OU1/ADDITIONAL SHALLOW WELL LOGS

Well Location: Courtland Avenue adjacent Markland Avenue Quarry	Easting: 196995'	Well No: UA-27	
Project Site: Continental Steel	Northing: 1905418'	Project No: 6802	
Drilled: 07/29/93 - 08/02/93	Ground Elevation: 806.98'	Datum: Mean Sea Level	
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV	
Riser: type: PVC dia: 2.00" from: 0.2' to: 5.00'	Borehole Diameter: 8.00"	Total Depth: 17.50'	
	Logged By: J. Kralik	Checked By: D. Walsh	
Screen: type: Slotted size: .010" dia: 2.00" from: 5.00' to: 15.00'	Measuring Point: 806.80'	Completion Depth: 15.00'	
	Water Level Elevation: 794.28'	Sheet 1 of 1	
Annular Fill: type: Bentonite from: 1.00' to: 4.00' type: #5 Global Sand from: 4.00' to: 17.50' type: from: to:	Remarks: Borehole diameter from 4.5 to 17.2 ft. is 2.9 in.		

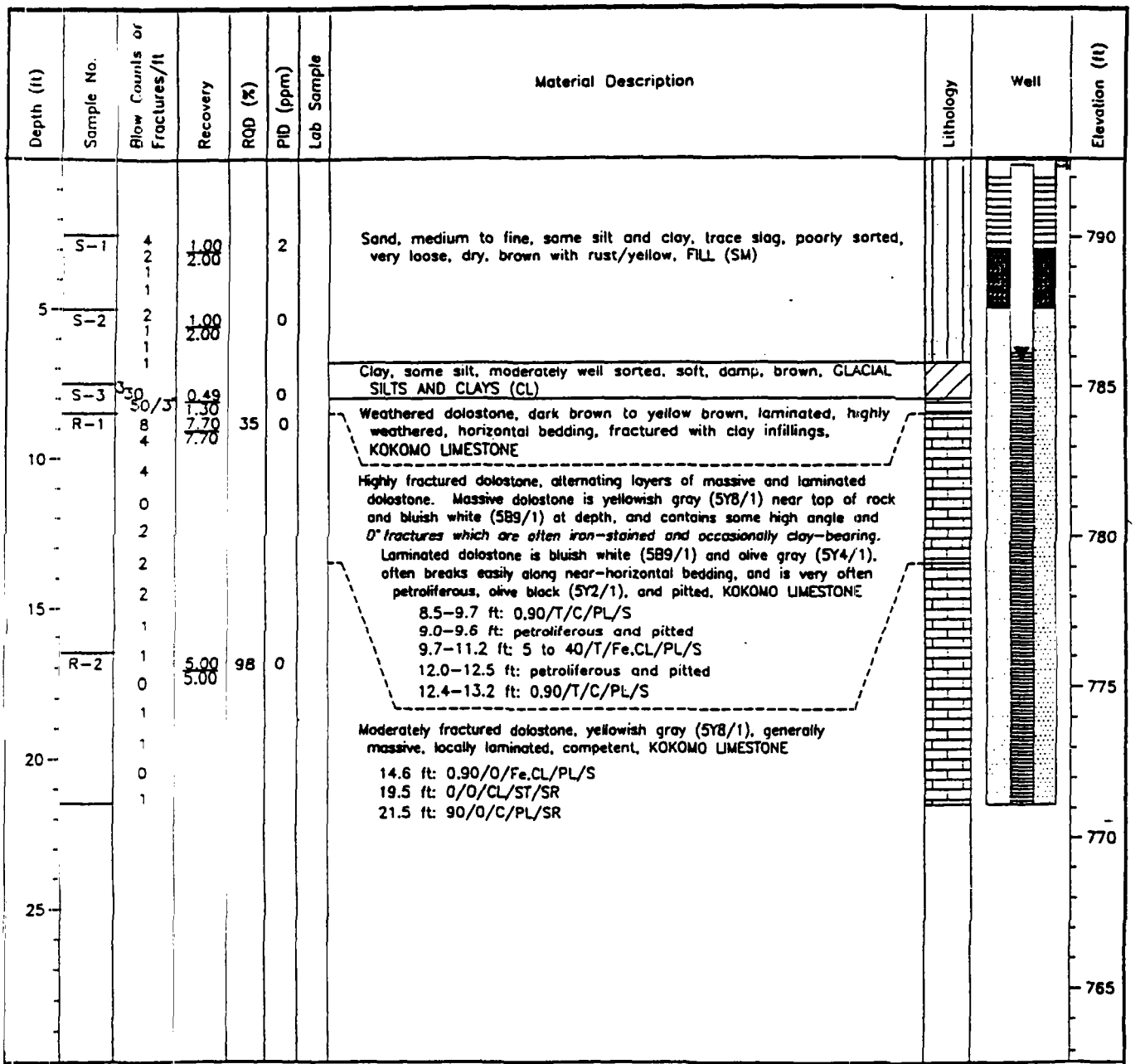
Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
							Topsoil, some fill. FILL			
	S-1	4 7 8 50/1"	1.20/1.60		0.2		Clay, some fine sand, trace coarse to fine gravel, stiff, dry to damp, dark yellow brown to pale yellow gray. FILL (CL)			805
	R-1	9 2 14	2.80/3.50	0			4.5 ft: Auger refusal			
5							Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted. KOKOMO LIMESTONE			800
	R-2	2 2 1	4.00/4.00	73						
10										
	R-3	0 5 0 3 1 4 5	5.52/6.00	25						795
15										
							4.0-5.0 ft: 0,45/0/Fe/PL/SR 5.2 ft: 15/0/Fe/PL/SR 6.0-7.5 ft: 0,85/T/Fe,CL/PL/S 7.8 ft: 85/T/C/PL/SR 8.7 ft: 5/T/CL,Fe/W/R 9.0 ft: 0/0/Ca/CP/S 11.2 ft: 0/T/Ca/PL/S 11.7 ft: 5/T/CL,Fe/W/R 13.0-13.3 ft: 80/0/Fe/PL/S 13.5 ft: 5/0/CL,Fe/W/R 13.7 ft: 5/0/C/ST/R 14.0-16.0 ft: 0/T/Fe/PL/S 14.9-15.1 ft: petroliferous and pitted 16.0-17.2 ft: 0,45,85/T/C,Fe/PL/S 17.1-17.2 ft: petroliferous and pitted			790
20										785
25										780

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Haynes Int'l Parking Lot, Park Avenue	Easting: 195355'	Well No: UA-28
Project Site: Continental Steel	Northing: 1906162'	Project No: 6802
Drilled: 08/10/93 - 08/10/93	Ground Elevation: 792.62'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Core/Rotary	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.2' to: 6.50'	Borehole Diameter: 8.00"	Total Depth: 21.50'
	Logged By: T. Taylor	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 6.50' to: 21.50'	Measuring Point: 792.43'	Completion Depth: 21.50'
	Water Level Elevation: 785.96'	Sheet 1 of 1
Annular Fill: type: Bentonite from: 3.00' to: 5.00'; type: #5 Global Sand from: 5.00' to: 21.50'; type: from: to:	Remarks: Borehole diameter from 8.0 to 21.5 ft. is 3.9 in.	



NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue		Easting: 194318'	Well No: UA-30
Project Site: Continental Steel		Northing: 1905004'	Project No: 6802
Drilled: 08/11/93 - 08/11/93		Ground Elevation: 793.02'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Core/Rotary		Contractor: Burlington	Rig: CME 55 ATV
Riser type: PVC dia: 2.00" from: 0.2' to: 8.00'		Borehole Diameter: 8.00"	Total Depth: 23.50'
		Logged By: T. Taylor	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 8.00' to: 23.00'		Measuring Point: 792.86'	Completion Depth: 23.00'
		Water Level Elevation: 783.51'	Sheet 1 of 1
Annular Fill: type: Grout from: 3.00' to: 5.40' type: Bentonite from: 5.40' to: 7.50' type: #5 Global Sand from: 7.50' to: 23.00'		Remarks: Borehole diameter from 7.5 to 23.0 ft. is 3.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	4 4 2 2	1.00 2.00				Sand, medium to fine, slag and coarse gravel, loose, dry, black, FILL			
							Silty clay, firm, dry, dark brown (10yr3/2), FILL (CL)			
5	S-2	4 4 15 45	1.50 2.00				Clayey silt, trace rock fragments, very stiff, dry, yellow brown (10YR7/3), weathered dolostone, KOKOMO LIMESTONE			790
	R-1	>10 6 >10 >10 4 0 2 1 0	7.83 9.00	53			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE 7.5-10.2 ft: 0/0/Fe/PL,ST/SR 10.0-16.0 ft: petroliferous and pitted 10.2-16.5 ft: 0/0/C/PL/S 13.1-13.3 ft: 90/0/C/PL/S			785
10										
15	R-2	x 0 6 0 4 0	4.50 5.00	64			17.0-17.6 ft: 0,90/0/C/PL/SR			780
							Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 19.4-19.8 ft: 0,90/0/C/PL/SR			775
20	R-3	0 0 2 0	1.80 2.00	70			22.1-22.5 ft: 90/0/C/PL/S 22.5-22.9 ft: dark gray 22.9-23.5 ft: light blue gray, competent			770
25										765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue	Easting: '94499'	Well No: UA-29	
Project Site: Continental-Steel	Northing: 1905586'	Project No: 6802	
Drilled: 08/05/93 - 08/06/93	Ground Elevation: 792.17'	Datum: Mean Sea Level	
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV	
Riser: type: PVC dia: 2.00" from: 0.3' to: 6.00'	Borehole Diameter: 8.00"	Total Depth: 26.50'	
	Logged By: J. Kralik	Checked By: D. Walsh	
Screen: type: Slotted size: .010" dia: 2.00" from: 6.00' to: 21.00'	Measuring Point: 791.90'	Completion Depth: 21.00'	
	Water Level Elevation: 784.63'	Sheet 1 of 1	
Annular Fill: type: Bentonite from: 1.00' to: 5.00'; type: #5 Global Sand from: 5.00' to: 26.50'; type: from: to:	Remarks: Borehole diameter from 10.0 to 26.2 ft. is 2.9 in.		

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
							ASPHALT			
	S-1	2 50/3"	0.71 0.80		0		Clay, some gravel and coarse sand, soft, damp, yellowish brown (10YR5/4), FILL (CL)			790
5	S-2	2 7 13 24	1.50 2.00		0		5.0 ft: dark brown (7.5YR3/3) Alternating layers of light brown (7.5YR6/3) to brown (7.5YR5/3) clay, dry, and dolostone, granular, thinly bedded, dry to damp, weathered dolostone, KOKOMO LIMESTONE			785
	S-3	20 39 50/2"	1.03 1.20		0					
10	R-1	>10 5 4 x x x	2.60 6.50	0	2		Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			780
15							10.0-19.5 ft: 0.90/T/C/PL/S 10.2-11.0 ft: petroliferous 11.3-19.6 ft: petroliferous and pitted			775
	R-2	5 10 >10 6	8.80 10.00	24						
20		2 2 x 2					19.5-20.0 ft: 0.80/T/C/PL/S 20.0-21.5 ft: 85/T/C/PL/S-SR 21.3-22.2 ft: petroliferous and pitted 21.5-22.2 ft: 0.80/0/C/PL/SR			770
		1 2 x					Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			
25							22.2-22.5 ft: 0.80/0/C/PL/SR 23.0-24.0 ft: pitted 23.5-24.5 ft: 75.85/T/Ca/PL/SR			765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue		Easting: '94499'	Well No: UA-29
Project Site: Continental-Steel		Northing: 1905586'	Project No: 6802
Drilled: 08/05/93 - 08/06/93		Ground Elevation: 792.17'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.3' to: 6.00'		Borehole Diameter: 8.00"	Total Depth: 26.50'
		Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 6.00' to: 21.00'		Measuring Point: 791.90'	Completion Depth: 21.00'
		Water Level Elevation: 784.63'	Sheet 1 of 1
Annular Fill: type: Bentonite from: 1.00' to: 5.00'; type: #5 Global Sand from: 5.00' to: 26.50'; type: from: to:		Remarks: Borehole diameter from 10.0 to 26.2 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
							ASPHALT			
	S-1	2 50/3"	0.71 0.80		0		Clay, some gravel and coarse sand, soft, damp, yellowish brown (10YR5/4), FILL (CL)			790
5	S-2	2 7 13 24	1.50 2.00		0		5.0 ft: dark brown (7.5YR3/3) Alternating layers of light brown (7.5YR6/3) to brown (7.5YR5/3) clay, dry, and dolostone, granular, thinly bedded, dry to damp, weathered dolostone, KOKOMO LIMESTONE			785
	S-3	20 39 50/2"	1.03 1.20		0					
10	R-1	>10 5 4 x x x	2.60 6.50	0	2		Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE 10.0-19.5 ft: 0.90/T/C/PL/S 10.2-11.0 ft: petroliferous 11.3-19.6 ft: petroliferous and pitted			780
15	R-2	5 10 >10 6 2 2 x	8.80 10.00	24						775
20		2 x 2 1 2 x					19.5-20.0 ft: 0.80/T/C/PL/S 20.0-21.5 ft: 85/T/C/PL/S-SR 21.3-22.2 ft: petroliferous and pitted 21.5-22.2 ft: 0.80/0/C/PL/SR Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 22.2-22.5 ft: 0.80/0/C/PL/SR 23.0-24.0 ft: pitted 23.5-24.5 ft: 75.85/T/Ca/PL/SR			770
25										765

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Trailer Park		Easting: 193963'	Well No: UA-31
Project Site: Continental Steel		Northing: 1905627'	Project No: 6802
Drilled: 08/17/93 - 08/17/93		Ground Elevation: 801.09'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Core/Rotary		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.3' to: 22.00'		Borehole Diameter: 8.00"	Total Depth: 32.00'
		Logged By: T. Taylor	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 22.00' to: 32.00'		Measuring Point: 800.82'	Completion Depth: 32.00'
		Water Level Elevation: 783.87'	Sheet 1 of 2
Annular Fill: type: Grout from: 3.00' to: 18.00'; type: Bentonite from: 18.00' to: 19.50'; type: #5 Global Sand from: 19.50' to: 32.00'		Remarks: Borehole diameter from 18.5 to 32.0 ft. is 3.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Elevation (ft)
					0			800
	S-1	1 4 5 3	1.00/2.00		0		Sand and silt, fine, with red brick and glass, poorly sorted, stiff, damp, brown, FILL (SM)	
5	S-2	1 1 1 2	1.20/2.00		0		Sand and clay, very fine, with brick and debris fragments, poorly sorted, very soft, wet, brown (7.5YR3/3), FILL (SC)	795
	S-3	WoH 50/3"	0.71/0.80		0			
10	S-4	1 1 1 7	0.40/2.00		0			790
	S-5	44 3 3 2	1.10/2.00		0		13.4 ft: sand lens, (5YR5/4)	
15	S-6	1 1 2 1	2.00/2.00		0		Clay, some silt, soft, moist, dark gray (5YR3/1), FILL (CL)	785
	S-7	1 1 2 50/4"	1.49/1.80		0		Weathered dolostone, KOKOMO LIMESTONE	
20	R-1	>10 7 >10	3.50/3.50	0	0		Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE	780
	R-2	2 2	7.90/8.50	76	0			
25		0 0 0 3 3					20.0-22.0 ft: 0,90/T/C/P/S 20.0-24.5 ft: petroliferous and pitted 20.5 ft: 1" calcite seam 22.0-23.0 ft: 0,90/0/Fe/PL,ST/SR 24.0-24.5 ft: 0,50,85/H,T/CL,C/PL/SLK	775
							Moderately fractured dolostone (see page 2 for description)	

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Trailer Park		Easting: 193963'	Well No: UA-31
Project Site: Continental Steel		Northing: 1905627'	Project No: 6802
Drilled: 08/17/93 - 08/17/93		Ground Elevation: 801.09'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Core/Rotary		Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.3' to: 22.00'		Borehole Diameter: 8.00"	Total Depth: 32.00'
		Logged By: T. Taylor	Checked By: D. Walsh
Screen type: Slotted size: .010" dia: 2.00" from: 22.00' to: 32.00'		Measuring Point: 800.82'	Completion Depth: 32.00'
		Water Level Elevation: 783.87'	Sheet 2 of 2
Annular Fill: type: Grout from: 3.00' to: 18.00' type: Bentonite from: 18.00' to: 19.50' type: #5 Global Sand from: 19.50' to: 32.00'		Remarks: Borehole diameter from 18.5 to 32.0 ft. is 3.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	R-2 (cont.)	2 0	7.90 8.50	76	0		Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 24.5-25.0 ft: 0,50,85/H,T/CL,C/PL/SLK 24.5-27.0 ft: petroliferous and pitted 28.0 ft: 10/0/CL/W/R 29.0-30.5 ft: 60/T/C/ST/SR 32.0 ft: possible slickensides on secondary minerals along one fracture			770
35										765
40										760
45										755
50										750
55										745

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Waste Water Treatment Plant	Easting: 193519'	Well No: UA-32
Project Site: Continental Steel	Northing: 1904253'	Project No: 6802
Drilled: 07/26/93 - 07/27/93	Ground Elevation: 794.07'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: -2.4' to: 13.00'	Borehole Diameter: 8.00"	Total Depth: 30.00'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 13.00' to: 28.00'	Measuring Point: 797.07'	Completion Depth: 28.00'
	Water Level Elevation: 780.43'	Sheet 1 of 1
Annular Fill: type: Grout from: 1.00' to: 8.00' type: Bentonite from: 8.00' to: 10.00' type: #5 Global Sand from: 10.00' to: 30.00'	Remarks: Borehole diameter from 15.0 to 30.0 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
							Topsoil, trace fill, plant debris, dark brown (5YR3/2) to black, FILL			
	S-1	6 5 5 6	2.00/2.00		0		Silty clay, little coarse to fine sand, trace to some coarse to fine gravel, trace plant debris, stiff, dry to moist, moderate yellow brown (10YR5/4) to light olive gray (5Y5/2), FILL (CL)			
5	S-2	3 3 5 7	1.50/2.00		0					790
	S-3	6 8 10 12	1.50/2.00		0					
							Silty clay, little coarse to fine sand and fine to medium gravel, very stiff, dry to moist, moderate yellow brown (10YR5/4) to grayish orange (10YR7/4), GLACIAL SILTS AND CLAYS (CL)			
10	S-4	4 4 10 10	1.50/2.00		0					785
	S-5	10 38 39 31	1.50/2.00		0					
							Dolostone fragments and silty clay, some coarse to medium sand, damp to dry, light brownish gray (10YR6/2), weathered dolostone, KOKOMO LIMESTONE			
15	R-1	>10 x 3	0.50/2.50	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted. KOKOMO LIMESTONE			780
	R-2	5 6	1.80/5.00	8						
20		1 x					15.0-17.5 ft: •/0/Fe-C/P/S 17.5-19.2 ft: 0/T/Fe,Ca,C/P/S 18.3-24.5 ft: petroliferous and pitted			775
	R-3	>10 >10	5.00/5.00	36			19.2-22.5 ft: 90/T/Fe/P/S 22.5-23.5 ft: •/0/C/P/S 23.5-24.5 ft: 0.90/T/Fe/P/S			
		3					Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			
25		0 3					24.5-25.0 ft: petroliferous and pitted 26.8-28.0 ft: 45,90/T/C/P/S			770
	R-4	2 2	2.20/2.50	60			28.9-29.8 ft: pitted 28.0-30.0 ft: 0/T/C/P/S			
		0								

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Millbrook Lane	Easting: 193091'	Well No: UA-33
Project Site: Continental Steel	Northing: 1905009'	Project No: 6802
Drilled: 08/11/93 - 08/12/93	Ground Elevation: 809.12'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.2' to: 35.00'	Borehole Diameter: 8.00"	Total Depth: 46.70'
	Logged By: T. Taylor	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 35.00' to: 45.00'	Measuring Point: 808.90'	Completion Depth: 45.00'
	Water Level Elevation: 7780.47'	Sheet 1 of 2
Annular Fill: type: Grout from: 3.00' to: 31.00'; type: Bentonite from: 31.00' to: 33.50'; type: #5 Global Sand from: 33.50' to: 46.70'	Remarks: Borehole diameter from 22.9 to 46.7 ft. is 2.9 ft.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	S-1	6 6 8 8	1.00 / 2.00				Silty clay, firm to stiff, dry, dark brown (7.5YR4/7) and gray (7.5YR6/0) with rusty mottling, FILL (CL)			
5	S-2	2 2 4 5	1.00 / 2.00							805
	S-3	2 1 2 3	1.00 / 2.00							
10	S-4	5 6 8 17	2.00 / 2.00				Silty clay, trace gravel and pebbles, stiff to very stiff, wet, brown with rusty mottling, GLACIAL SILTS AND CLAYS (CL)			800
	S-5	8 9 13 14	1.60 / 2.00				15.4 ft: subrounded pebbles, damp to dry, gradually becoming gray (10YR5/1) with sand lens.			
15	S-6	7 7 8 11	1.70 / 2.00							795
	S-7	3 16 30 30	1.80 / 2.00				Gravelly sand, coarse to fine, with pebbles, poorly sorted, dense, damp, brown (10YR5/4), GLACIAL SANDS AND GRAVELS (SP)			
20	S-8	13 14 16 17	1.70 / 2.00							790
	S-9	50/5"	0.10 / 0.40				23.0 ft: Auger refusal. Cored from 23.0 to 30.0 ft. in order to penitrate the dense glacial till.			785
25										
										780

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Berkely Avenue	Easting: '92086'	Well No: UA-34
Project Site: Continental Steel	Northing: 1905219'	Project No: 6802
Drilled: 07/28/93 - 08/05/93	Ground Elevation: 799.98'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: type: PVC dia: 2.00" from: 0.2' to: 22.00'	Borehole Diameter: 8.00"	Total Depth: 37.50'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 22.00' to: 37.00'	Measuring Point: 799.75'	Completion Depth: 37.00'
	Water Level Elevation: 7782.78'	Sheet 1 of 2
Annular Fill: type: Grout from: 1.00' to: 14.00'; type: Bentonite from: 14.00' to: 21.00'; type: #5 Global Sand from: 21.00' to: 37.50'	Remarks: UA-34 log is based on UA-34 and UA-34A. UA-34 was terminated at 32.0 ft. and backfilled with bentonite-cement grout because the borehole was off-center. The well was installed in UA-34A, renamed UA-34. Borehole diameter from 22.0 to 32.0 ft. is 3.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
							Road gravel and topsoil, medium to fine, dry, moderate brown (5YR3/4), FILL (GM)			
	S-1	6 5 5 7	1.30 / 2.00				Clay, some coarse to medium sand and fine gravel, stiff, dry to damp, dark brown (7.5YR4/4), FILL (CL)			
5	S-2	5 6 7 9	1.50 / 2.00				Sandy/gravelly clay, coarse to medium, stiff, dark brown (7.5YR4/4), FILL (CL)			795
	S-3	2 2 1 2	1.50 / 2.00				Silt/clayey silt, some medium to fine sand, trace fine gravel, sticky, soft, damp to wet, brown (7.5YR5/3), FILL (ML)			
10	S-4	1 1 2 1	1.30 / 2.00				Silt, trace to some coarse to fine sand and gravel, some clay, soft, damp to wet, brown (7.5YR5/3 to 7.5YR5/4), FILL (ML)			790
	S-5	11 14 16 17	1.30 / 2.00				Silty clay, some fine sand, trace fine gravel, pebbles, very stiff, dry to moist, dark gray (10YR4/1), GLACIAL SILTS AND CLAYS (CL)			
15	S-6	5 [illegible] 18	1.80 / 2.00							785
	S-7	3 6 9 12	1.50 / 2.00							
20	S-8	4 50/5"	0.70 / 0.90				Sand/Sand and gravel, coarse to medium, some fine sand, some clay and silt, bedrock fragments, medium dense, wet to saturated, dark gray (10YR4/1), GLACIAL SANDS AND GRAVELS (GM)			780
	R-1	2 6	9.50 / 9.50	18			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0" fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted. KOKOMO LIMESTONE			
25		6 5 3 5 5					22.5-28.0 ft: 10,45,80/0,H/CL,Fe-24.0 ft/CP/SR possible fault zone 28.5-30.4 ft: 0,90/T/C/PL-ST/R-SR 28.7-30.2 ft: petroliferous and pitted			775

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Berkely Avenue	Easting: 192086'	Well No: UA-34
Project Site: Continental Steel	Northing: 1905219'	Project No: 6802
Drilled: 07/28/93 - 08/05/93	Ground Elevation: 799.98'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: Burlington	Rig: CME 55 ATV
Riser: Type: PVC dia: 2.00" from: 0.2' to: 22.00'	Borehole Diameter: 8.00"	Total Depth: 37.50'
	Logged By: J. Kralik	Checked By: D. Walsh
Screen: Type: Slotted size: .010" dia: 2.00" from: 22.00' to: 37.00'	Measuring Point: 799.75'	Completion Depth: 37.00'
	Water Level Elevation: 7782.78'	Sheet 2 of 2
Annular Fill: Type: Grout from: 1.00' to: 14.00' Type: Bentonite from: 14.00' to: 21.00' Type: #5 Global Sand from: 21.00' to: 37.50'	Remarks: UA-34 log is based on UA-34 and UA-34A. UA-34 was terminated at 32.0 ft. and backfilled with bentonite-cement grout because the borehole was off-center. The well was installed in UA-34A, renamed UA-34. Borehole diameter from 22.0 to 32.0 ft. is 3.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
	R-1 (cont.)	2	9.50/9.50	18			Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			
	R-2	3	5.00/5.50	80			30.2-32.5 ft: petroliferous and pitted 32.5-32.8 ft: 0,90/C/P/SR 32.5-37.2 ft: sparsely pitted 33.5-37.5 ft: 0/C/P/S			
		1								
35		1								765
		1								
		2								
40										760
45										755
50										750
55										745

NOTE: Soil colors are based on Munsell Soil Color Charts, 1990 edition revised.
Rock colors are based on Rock-Color Chart.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Courtland and Markland Avenues	Easting: 196996'	Well No: UA-3'
Project Site: Continental Steel	Northing: 1904700'	Project No: 6832
Drilled: 06/16/93 - 07/14/93	Ground Elevation: 804.21'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.1' to: 28.70'	Borehole Diameter: 7.88"	Total Depth: 136.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 28.70' to: 45.70'; type: Port size: .250" dia: 1.50" from: 68.70' to: 80.70'; type: Port size: .250" dia: 1.50" from: 115.70' to: 136.00'	Logged By: K. Hewitt	Checked By: D. Walsh
	Measuring Point: 806.31'	Completion Depth: 131.70'
	Water Level Elevation: 799.18'	Sheet 1 of 5
Casing: type: Steel dia: 6.0" from: -2.32' to: 25.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 25.0 to 136.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						OVERBURDEN (See UA-01 Boring Log for details from 0 to 21.6 ft. below ground surface)			
5						4.5 ft: Auger refusal Highly fractured dolostone, KOKOMO LIMESTONE			800
						Moderately fractured dolostone, KOKOMO LIMESTONE			
10									795
15									790
20									785
						Slightly fractured dolostone, KOKOMO LIMESTONE			
25									780
									775

NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Courtland and Markland Avenues	Easting: 196996'	Well No: LA-01
Project Site: Continental Steel	Northing: 1904700'	Project No: 6802
Drilled: 06/16/93 - 07/14/93	Ground Elevation: 804.21'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.1' to: 28.70'	Borehole Diameter: 7.88"	Total Depth: 136.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 28.70' to: 45.70' type: Port size: .250" dia: 1.50" from: 68.70' to: 80.70' type: Port size: .250" dia: 1.50" from: 115.70' to: 136.00'	Measuring Point: 806.31'	Completion Depth: 131.70'
	Water Level Elevation: 799.18'	Sheet 2 of 5
Casing: type: Steel dia: 6.0" from: -2.32' to: 25.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 25.0 to 136.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						Slightly fractured dolostone, KOKOMO LIMESTONE (continued)			
						33 ft: interpreted fracture			
35									770
40									765
						44 ft: interpreted fluid-bearing fracture			760
45									
50									755
55									750
									745

NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Courtland and Markland Avenues	Easting: 196996'	Well No: LA-0'
Project Site: Continental Steel	Northing: 1904700'	Project No: 6202
Drilled: 06/16/93 - 07/14/93	Ground Elevation: 804.21'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.1' to: 28.70'	Borehole Diameter: 7.88"	Total Depth: 136.50'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 28.70' to: 45.70' type: Port size: .250" dia: 1.50" from: 68.70' to: 80.70' type: Port size: .250" dia: 1.50" from: 115.70' to: 136.00'	Measuring Point: 806.31'	Completion Depth: 131.70'
	Water Level Elevation: 799.18'	Sheet 3 of 5
Casing: type: Steel dia: 6.0" from: -2.32' to: 25.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 25.0 to 136.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						Slightly fractured dolostone, KOKOMO LIMESTONE (continued)			
						LISTON CREEK, UNIT A			
						62 ft: interpreted fracture			
55									740
						67 ft: partial loss in fluid circulation 67-70 ft: difficult drilling			
70						70-78 ft: easier drilling			735
						72-73 ft: interpreted fracture zone			
75									730
						77 ft: interpreted fracture			
						78-136 ft: difficult drilling			
80									725
									720
85									
									715

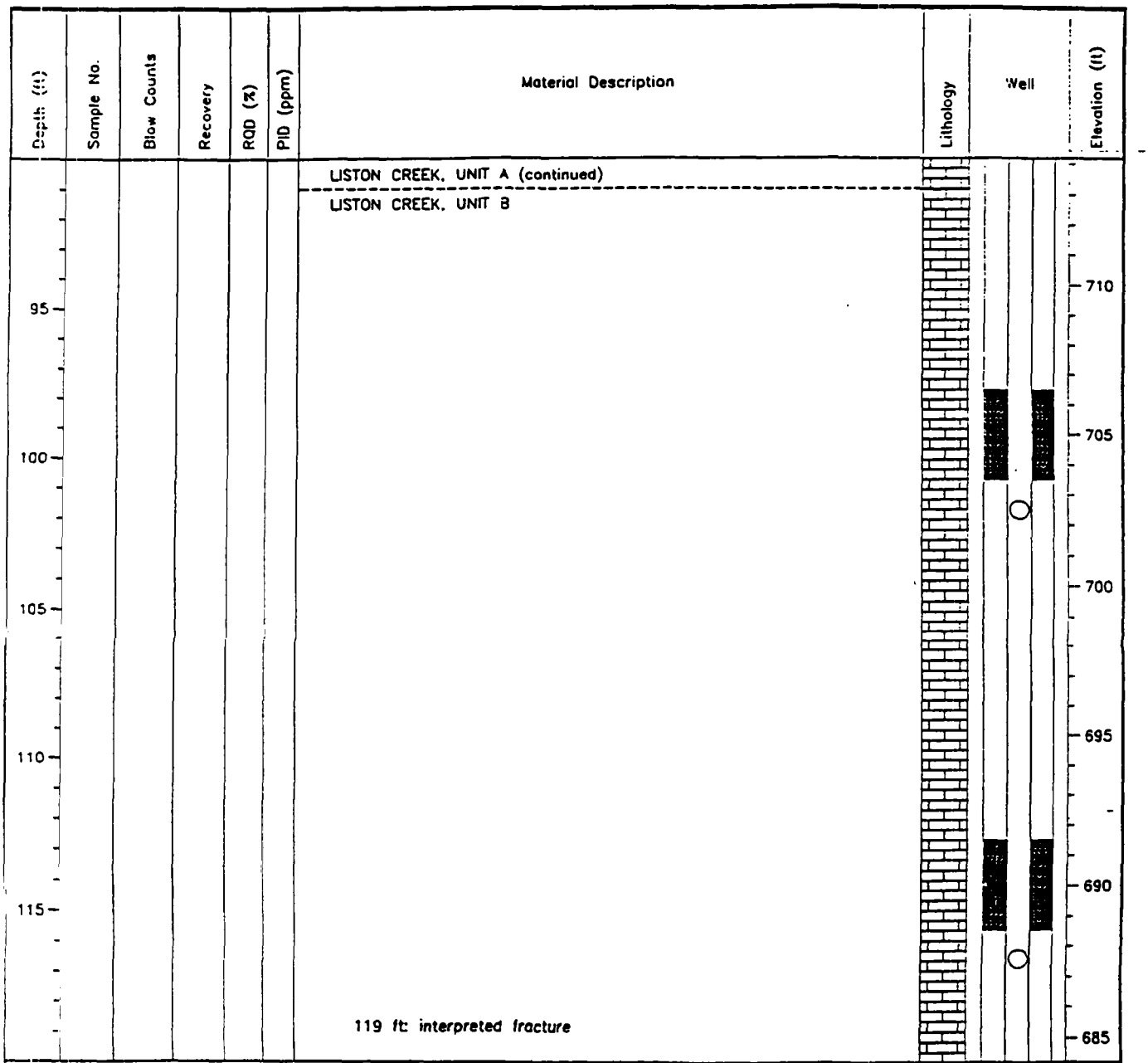
NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Courtland and Markland Avenues	Easting: 196996'	Well No: LA-0'
Project Site: Continental Steel	Northing: 1904700'	Project No: 6802
Drilled: 06/16/93 - 07/14/93	Ground Elevation: 804.21'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.1' to: 28.70'	Borehole Diameter: 7.88"	Total Depth: 136.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 28.70' to: 45.70' type: Port size: .250" dia: 1.50" from: 68.70' to: 80.70' type: Port size: .250" dia: 1.50" from: 115.70' to: 136.00'	Measuring Point: 806.31'	Completion Depth: 131.70'
	Water Level Elevation: 799.18'	Sheet 4 of 5
Casing: type: Steel dia: 6.0" from: -2.32' to: 25.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 25.0 to 136.0 ft. is 4.2 in.	



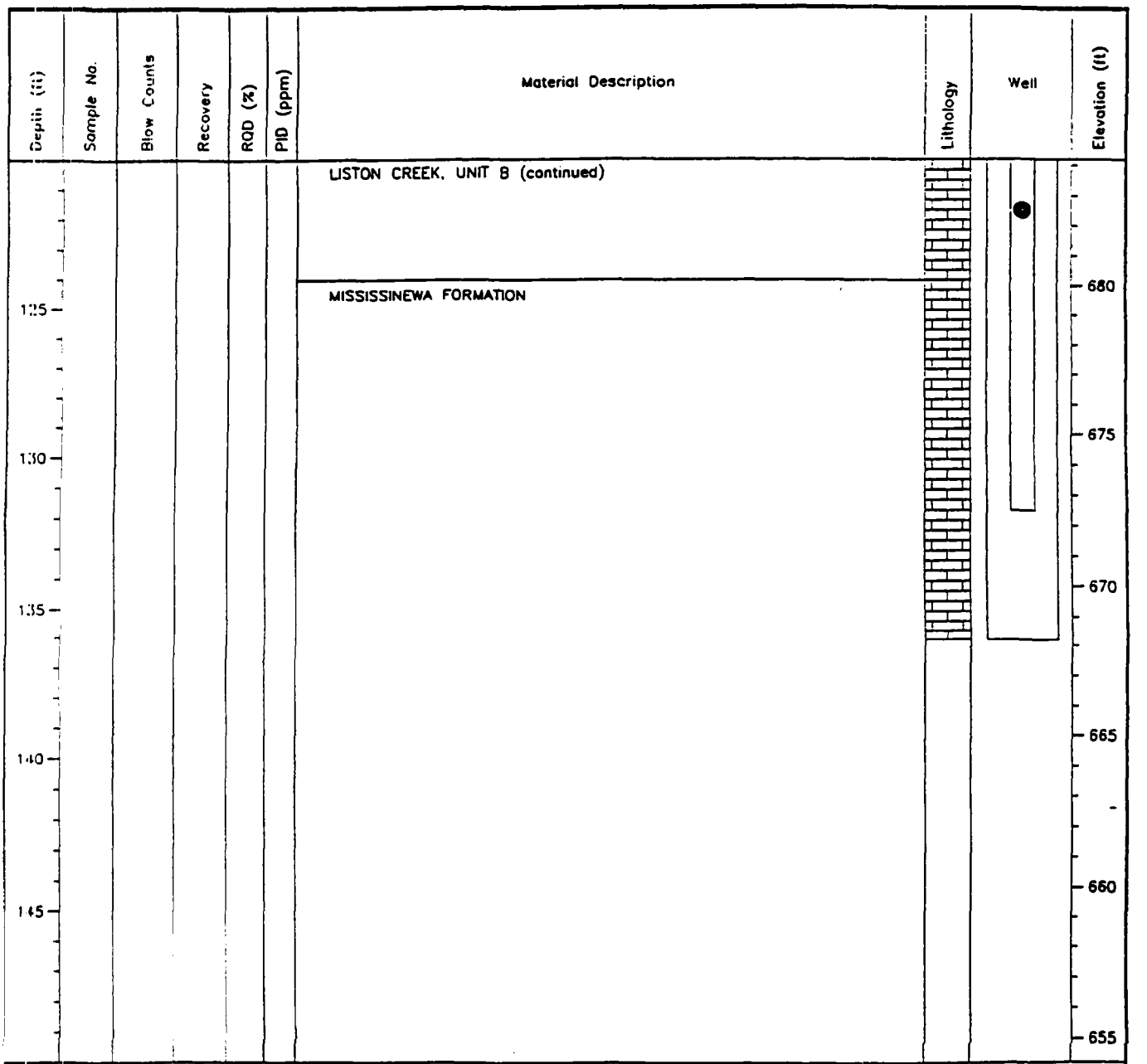
NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Courtland and Markland Avenues	Easting: 196996'	Well No: A-01
Project Site: Continental Steel	Northing: 1904700'	Project No: 6802
Drilled: 06/16/93 - 07/14/93	Ground Elevation: 804.21'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.1' to: 28.70'	Borehole Diameter: 7.88"	Total Depth: 136.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 28.70' to: 45.70'	Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250" dia: 1.50" from: 68.70' to: 80.70'	Measuring Point: 806.31'	Completion Depth: 131.70'
type: Port size: .250" dia: 1.50" from: 115.70' to: 136.00'	Water Level Elevation: 799.18'	Sheet 5 of 5
Casing: type: Steel dia: 6.0" from: -2.32' to: 25.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 25.0 to 136.0 ft. is 4.2 in.	



NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Brandon Street adjacent Markland Avenue Quarry		Easting: 195770'	Well No: UA-02
Project Site: Continental Steel		Northing: 1905395'	Project No: 6802
Drilled: 06/15/93 - 07/15/93		Ground Elevation: 799.51'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC	dia: 1.50" from: -2.7' to: 45.00'	Borehole Diameter: 7.88"	Total Depth: 132.00'
Monitoring Zones:		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250"	dia: 1.50" from: 45.00' to: 57.00'	Measuring Point: 802.20'	Completion Depth: 128.00'
type: Port size: .250"	dia: 1.50" from: 60.00' to: 72.00'	Water Level Elevation: 792.89'	Sheet 1 of 5
type: Port size: .250"	dia: 1.50" from: 112.00' to: 132.00'		
Casing: type: Steel	dia: 6.0" from: -2.86' to: 24.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 24.0 to 132.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						OVERBURDEN (See UA-05 Boring Log for details from 0 to 23.5 ft. below ground surface)			
5						4.5 ft: Auger refusal Highly fractured dolostone, KOKOMO LIMESTONE			795
10									790
						Moderately fractured dolostone, KOKOMO LIMESTONE			
15									785
20						Slightly fractured dolostone, KOKOMO LIMESTONE			780
25									775
									770

NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Brandon Street adjacent Markland Avenue Quarry		Easting: 195770'	Well No: LA-02
Project Site: Continental Steel		Northing: 1905395'	Project No: 6802
Drilled: 06/15/93 – 07/15/93		Ground Elevation: 799.51'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: −2.7' to: 45.00'		Borehole Diameter: 7.88"	Total Depth: 132.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 45.00' to: 57.00' type: Port size: .250" dia: 1.50" from: 60.00' to: 72.00' type: Port size: .250" dia: 1.50" from: 112.00' to: 132.00'		Logged By: K. Hewitt	Checked By: D. Walsh
		Measuring Point: 802.20'	Completion Depth: 128.00'
		Water Level Elevation: 792.89'	Sheet 2 of 5
Casing: type: Steel dia: 6.0" from: −2.86' to: 24.00'		Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 24.0 to 132.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						Slightly fractured dolostone, KOKOMO LIMESTONE (continued)			
35									765
40									760
45									755
						LISTON CREEK, UNIT A 49–54 ft: interpreted fluid-bearing fracture zone			750
50									
55									745
									740

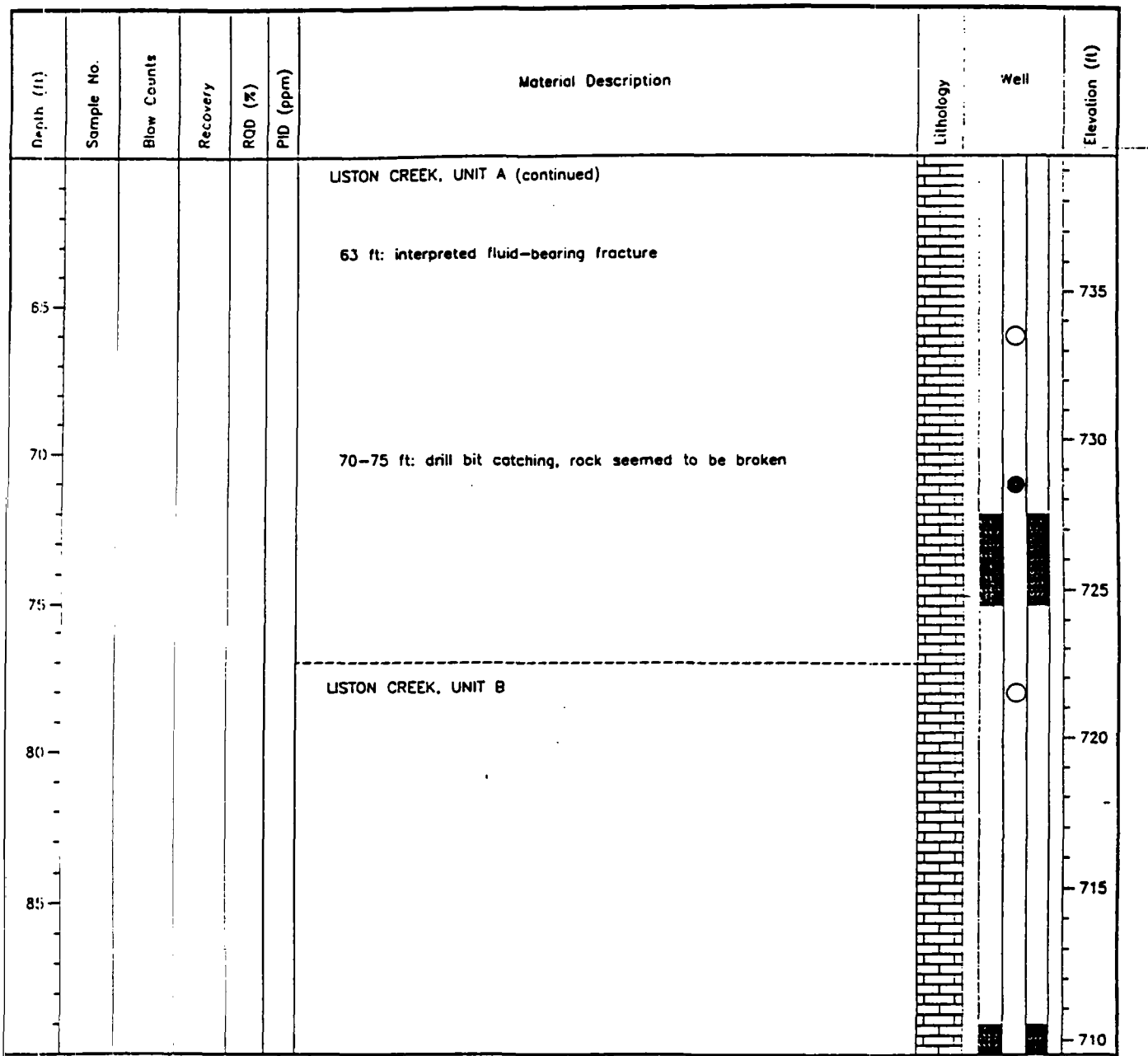
NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Brandon Street adjacent Markland Avenue Quarry	Easting: 195770'	Well No. LA-02
Project Site: Continental Steel	Northing: 1905395'	Project No: 6232
Drilled: 06/15/93 - 07/15/93	Ground Elevation: 799.51'	Datum: Mean Sea Level
Drilling Method Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.7' to: 45.00'	Borehole Diameter: 7.88"	Total Depth: 132.30'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 45.00' to: 57.00' type: Port size: .250" dia: 1.50" from: 60.00' to: 72.00' type: Port size: .250" dia: 1.50" from: 112.00' to: 132.00'	Measuring Point: 802.20'	Completion Depth: 128.00'
	Water Level Elevation: 792.89'	Sheet 3 of 5
Casing: type: Steel dia: 6.0" from: -2.86' to: 24.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 24.0 to 132.0 ft. is 4.2 in.	



NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Brandon Street adjacent Markland Avenue Quarry	Easting: 195770'	Well No: LA-02
Project Site: Continental Steel	Northing: 1905395'	Project No: 6802
Drilled: 06/15/93 - 07/15/93	Ground Elevation: 799.51'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.7' to: 45.00'	Borehole Diameter: 7.88"	Total Depth: 132.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 45.00' to: 57.00' type: Port size: .250" dia: 1.50" from: 60.00' to: 72.00' type: Port size: .250" dia: 1.50" from: 112.00' to: 132.00'	Measuring Point: 802.20'	Completion Depth: 128.00'
	Water Level Elevation: 792.89'	Sheet 4 of 5
Casing: type: Steel dia: 6.0" from: -2.86' to: 24.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 24.0 to 132.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT B (continued)			
						93 ft: brief loss in fluid circulation			
95									705
100									700
105									695
110									690
115									685
									680

NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Brandon Street adjacent Markland Avenue Quarry	Easting: 195770'	Well No: LA-02
Project Site: Continental Steel	Northing: 1905395'	Project No: 6802
Drilled: 06/15/93 - 07/15/93	Ground Elevation: 799.51'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.7' to: 45.00'	Borehole Diameter: 7.88"	Total Depth: 132.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 45.00' to: 57.00'; type: Port size: .250" dia: 1.50" from: 60.00' to: 72.00'; type: Port size: .250" dia: 1.50" from: 112.00' to: 132.00'	Logged By: K. Hewitt	Checked By: D. Walsh
	Measuring Point: 802.20'	Completion Depth: 128.00'
	Water Level Elevation: 792.89'	Sheet 5 of 5
Casing: type: Steel dia: 6.0" from: -2.86' to: 24.00'	Remarks: Borehole diameter from 0 to 4.5 ft. is 13.0 in. and from 24.0 to 132.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT B (continued)			
						122 ft: interpreted fluid-bearing fracture			
125						MISSISSINEWA FORMATION			675
130									670
135									665
140									660
145									655
									650

NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue	Easting: 194162'	Well No: LA-03
Project Site: Continental Steel	Northing: 1905069'	Project No: 6802
Drilled: 06/22/93 - 07/16/93	Ground Elevation: 790.70'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.9' to: 26.50'	Borehole Diameter: 7.88"	Total Depth: 130.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 26.50' to: 38.50' type: Port size: .250" dia: 1.50" from: 41.50' to: 53.50' type: Port size: .250" dia: 1.50" from: 86.50' to: 103.50' type: Port size: .250" dia: 1.50" from: 106.50' to: 130.00'	Measuring Point: 793.58'	Completion Depth: 122.50'
	Water Level Elevation: 783.92'	Sheet 1 of 5
Casing: type: Steel dia: 6.0" from: -2.92' to: 30.00'	Remarks: Borehole diameter from 0 to 13.0 ft. is 13.0 in. and from 30.0 to 130 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
0						OVERBURDEN			790
5									785
10									780
13						13 ft: Auger refusal KOKOMO LIMESTONE			
15									775
20									770
25	R-1	x 0 0 0 2	4.98/6.00	70		Moderately fractured dolostone, light olive gray (5Y6/1), fine grained, locally laminated, competent and often petroliferous, olive black (5Y2/1) and pitted, KOKOMO LIMESTONE 28.5 ft: O/T/C/W/R 28.7 ft: 80/0/C/PL/SR			765

NOTE: Rock colors are based on Rock-Color Chart.
Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.
A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location: Park Avenue		Easting: 194162'	Well No: LA-03
Project Site: Continental Steel		Northing: 1905069'	Project No: 6802
Drilled: 06/22/93 - 07/16/93		Ground Elevation: 790.70'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.9' to: 26.50'		Borehole Diameter: 7.88"	Total Depth: 130.00'
Monitoring Zones:		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250" dia: 1.50" from: 26.50' to: 38.50'		Measuring Point: 793.58'	Completion Depth: 122.50'
type: Port size: .250" dia: 1.50" from: 41.50' to: 53.50'		Water Level Elevation: 783.92'	Sheet 2 of 5
type: Port size: .250" dia: 1.50" from: 86.50' to: 103.50'			
type: Port size: .250" dia: 1.50" from: 106.50' to: 130.00'			
Casing: type: Steel dia: 6.0" from: -2.92' to: 30.00'		Remarks: Borehole diameter from 0 to 13.0 ft. is 13.0 in. and from 30.0 to 130 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
	R-1	2				Moderately fractured dolostone (continued) 30.9 ft: BS/O/C/P/S 31.0 ft: O/O/CL/P/SR			760
						LISTON CREEK, UNIT A 32 ft: interpreted fracture			
35									755
40									750
45						47 ft: interpreted fluid-bearing fracture			745
50									740
55									735

NOTE: Rock colors are based on Rock-Color Chart.
Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.
A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location: Park Avenue		Easting: 194162'	Well No: LA-03
Project Site: Continental Steel		Northing: 1905069'	Project No: 6802
Drilled: 06/22/93 - 07/16/93		Ground Elevation: 790.70'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.9' to: 26.50'		Borehole Diameter: 7.88"	Total Depth: 130.00'
Monitoring Zones:		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250" dia: 1.50" from: 26.50' to: 38.50'		Measuring Point: 793.58'	Completion Depth: 122.50'
type: Port size: .250" dia: 1.50" from: 41.50' to: 53.50'		Water Level Elevation: 783.92'	Sheet 3 of 5
type: Port size: .250" dia: 1.50" from: 86.50' to: 103.50'			
type: Port size: .250" dia: 1.50" from: 106.50' to: 130.00'		Remarks: Borehole diameter from 0 to 13.0 ft. is 13.0 in. and from 30.0 to 130 ft. is 4.2 in.	
Casing: type: Steel dia: 6.0" from: -2.92' to: 30.00'			

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT A (continued)			730
65						LISTON CREEK, UNIT B 66 ft: interpreted fracture			725
70									720
75									715
80									710
85									705

NOTE: Rock colors are based on Rock-Color Chart.
Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.
A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location: Park Avenue		Easting: 194162'	Well No: LA-03
Project Site: Continental Steel		Northing: 1905069'	Project No: 6802
Drilled: 06/22/93 - 07/16/93		Ground Elevation: 790.70'	Datum: Mean Sea Level
Drilling Method Hollow Stem Auger/Rotary/Nx Rock Core		Contractor: Burlington	Rig: CME 75
Riser: type: PVC	dia: 1.50" from: -2.9' to: 26.50'	Borehole Diameter: 7.88"	Total Depth: 130.00'
Monitoring Zones:		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250"	dia: 1.50" from: 26.50' to: 38.50'	Measuring Point: 793.58'	Completion Depth: 122.50'
type: Port size: .250"	dia: 1.50" from: 41.50' to: 53.50'	Water Level Elevation: 783.92'	Sheet 4 of 5
type: Port size: .250"	dia: 1.50" from: 86.50' to: 103.50'		
type: Port size: .250"	dia: 1.50" from: 106.50' to: 130.00'		
Casing: type: Steel	dia: 6.0" from: -2.92' to: 30.00'	Remarks: Borehole diameter from 0 to 13.0 ft. is 13.0 in. and from 30.0 to 130 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT B (continued)			700
						92 ft: interpreted fracture			
95									695
						96 ft: partial loss in fluid circulation			
100						100 ft: interpreted fracture			690
						104-130 ft: total loss of fluid circulation, rock slightly softer			
105									685
						108 ft: possible fracture			
110									680
						MISSISSINEWA FORMATION			
115									675

NOTE: Rock colors are based on Rock-Color Chart.
Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.
A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location: Pork Avenue	Easting: '94162'	Well No: LA-03
Project Site: Continental Steel	Northing: 1905069'	Project No: 6802
Drilled: 06/22/93 - 07/16/93	Ground Elevation: 790.70'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.9' to: 26.50'	Borehole Diameter: 7.88"	Total Depth: 130.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 26.50' to: 38.50' type: Port size: .250" dia: 1.50" from: 41.50' to: 53.50' type: Port size: .250" dia: 1.50" from: 86.50' to: 103.50' type: Port size: .250" dia: 1.50" from: 106.50' to: 130.00'	Measuring Point: 793.58'	Completion Depth: 122.50'
	Water Level Elevation: 783.92'	Sheet 5 of 5
Casing: type: Steel dia: 6.0" from: -2.92' to: 30.00'	Remarks: Borehole diameter from 0 to 13.0 ft. is 13.0 in. and from 30.0 to 130 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						MISSISSINEWA FORMATION (continued)			670
125									665
130									660
135									655
140									650
145									645

NOTE: Rock colors are based on Rock-Color Chart.
Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.
A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent Main Plant	Easting: 193943'	Well No: UA-04
Project Site: Continental Steel	Northing: 1904305'	Project No: 6802
Drilled: 06/07/93 – 07/09/93	Ground Elevation: 793.35'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: Gus Pecn
Riser: type: PVC dia: 1.50" from: −2.1' to: 36.80'	Borehole Diameter: 7.88"	Total Depth: 129.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 36.80' to: 48.80'	Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250" dia: 1.50" from: 51.80' to: 63.80'	Measuring Point: 795.48'	Completion Depth: 124.80'
type: Port size: .250" dia: 1.50" from: 108.80' to: 129.00'	Water Level Elevation: 782.71'	Sheet 1 of 5
Casing: type: Steel dia: 6.0" from: −2.25' to: 32.50'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 33.0 to 129.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						OVERBURDEN (See UA-11 Boring Log for details from 0 to 29.0 ft. below ground surface)			790
5									785
10									780
15						Weathered dolostone, KOKOMO LIMESTONE			775
20						19.0 ft: Auger refusal Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			770
25	R-1	>10	2.00/2.00	0	2	25.0–28.0 ft: 0,90/H,T/C/PL,W/SR,R			
	R-2	7 4 2 0	4.41/4.90	56	0	28.0–28.4 ft: 0/T/C/PL/S pitted			765

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent Main Plant	Easting: 193943'	Well No: GA-04
Project Site: Continental Steel	Northing: 1904305'	Project No: 5802
Drilled: 06/07/93 - 07/09/93	Ground Elevation: 793.35'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: Gus Pech
Riser: type: PVC dia: 1.50" from: -2.1' to: 36.80'	Borehole Diameter: 7.88"	Total Depth: 129.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 36.80' to: 48.80'; type: Port size: .250" dia: 1.50" from: 51.80' to: 63.80'; type: Port size: .250" dia: 1.50" from: 108.80' to: 129.00'	Logged By: K. Hewitt	Checked By: D. Walsh
	Measuring Point: 795.48'	Completion Depth: 124.80'
	Water Level Elevation: 782.71'	Sheet 2 of 5
Casing: type: Steel dia: 6.0" from: -2.25' to: 32.50'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 33.0 to 129.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Elevation (ft)
		0				Highly fractured dolostone, KOKOMO LIMESTONE (continued)	
		0				28.4–31.5 ft: pitted	
	R-3	0	9.80/10.00	82	0	Moderately fractured dolostone, light olive gray (5Y6/1) to light bluish gray (5B7/1), moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE	
		0					760
		0					
35		0					
		3				36.8–37.0 ft: 0.80/0/C/W,PL/S,SR	
		0					
		1				38.7–38.9 ft: 80/T/C/PL/S	755
		0					
40		0					
		0				41–46 ft: interpreted fracture zone	
	R-4	1	4.68/6.00	48		Moderately fractured dolostone, banded yellowish gray (5Y8/1) and bluish white (5B9/1), fine grained, indistinct and contorted laminae, fossiliferous, some fossils pyritized, LISTON CREEK, UNIT A	
		1					750
		2				42.8 ft: 0/0/Fe/PL/S	
45		x				43.9 ft: 0/0/Fe/PL/S	
		2				44–48 ft: total loss of fluid circulation during coring	
		0				44.7–45.1 ft: 0.80/0/C/W/S	
	R-5	0	9.70/10.00	73		45.9–46.3 ft: 0.80/0/C/W/S	
		0				48.0–71.0 ft: medium gray (N5) chert nodules and mineralized voids	745
		0				49–129 ft: total loss of fluid circulation during coring	
50		0					
		1				51.8 ft: 0/0/C/W/S	
		0				52 ft: interpreted fracture	
		0				Slightly fractured dolostone, LISTON CREEK, UNIT A	740
		1				54.7 ft: 0/0/C/W/S	
55		0					
		1				56.9 ft: 0/0/C/W/S	
		0				57 ft: interpreted fluid-bearing fracture	
	R-6	0	9.60/10.00	95			735
		0					

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent Main Plant	Easting: 193943'	Well No: LA-04
Project Site: Continental Steel	Northing: 1904305'	Project No: 6802
Drilled: 06/07/93 - 07/09/93	Ground Elevation: 793.35'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: Gus Pech
Riser: type: PVC dia: 1.50" from: -2.1' to: 36.80'	Borehole Diameter: 7.88"	Total Depth: 129.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 36.80' to: 48.80' type: Port size: .250" dia: 1.50" from: 51.80' to: 63.80' type: Port size: .250" dia: 1.50" from: 108.80' to: 129.00'	Measuring Point: 795.48'	Completion Depth: 124.80'
	Water Level Elevation: 782.71'	Sheet 3 of 5
Casing: type: Steel dia: 6.0" from: -2.25' to: 32.50'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 33.0 to 129.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
		1				Slightly fractured dolostone, LISTON CREEK, UNIT A (continued)			
		0				60.1 ft: 0/0/C/W/S			
		0							
		0							730
65		0							
		0							
		0							
	R-7	1	10.00/10.00	97					725
70		1							
		0							
		0				Slightly fractured limestone, light gray (N7) to light olive gray (5Y6/1) with depth, with contorted and irregular laminae, few mineralized fossils and dark gray chert nodules, LISTON CREEK, UNIT B			
		0							
		0							720
		0							
75		0							
		0							
		0							
	R-8	0	10.00/10.00	100					715
		0							
80		0							
		0							
		0							
		0							710
		0							
85		0							
		0							
		0							
		0							
	R-9	0	9.50/10.00	95		88.0-98.0 ft: no visible chert nodules, very few mineralized fossils			705
		0							

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent: Main Plant	Easting: 193943'	Well No: GA-04
Project: Site: Continental Steel	Northing: 1904305'	Project No: 6802
Drilled: 06/07/93 - 07/09/93	Ground Elevation: 793.35'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: Gus Pech
Riser: type: PVC dia: 1.50" from: -2.1' to: 36.80'	Borehole Diameter: 7.88"	Total Depth: 129.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 36.80' to: 48.80'; type: Port size: .250" dia: 1.50" from: 51.80' to: 63.80'; type: Port size: .250" dia: 1.50" from: 108.80' to: 129.00'	Measuring Point: 795.48'	Completion Depth: 124.80'
	Water Level Elevation: 782.71'	Sheet 4 of 5
Casing: type: Steel dia: 6.0" from: -2.25' to: 32.50'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 33.0 to 129.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
		0				Slightly fractured limestone, LISTON CREEK, UNIT B (continued)			
		0							
		0							
		0							700
		0							
95		1				95.4 ft: O/T/C/W/R			
		0							
		0							
	R-10	0	5.00/5.00	100					695
		0				99.7 ft: dusky yellowish green (10GY3/2) cherty layer			
100		0							
		0							
		0							
	R-11	0	5.00/5.00	100					690
		0							
105		0							
		0							
		0				107.2 ft: dusky yellowish green (10GY3/2), wavy stylolites			
	R-12	0	5.00/5.00	100					685
		0							
110		0							
		0							
		0							
	R-13	0	4.60/5.00	100					680
		0							
115		0							
		0				116.0 ft: interpreted fluid-bearing fracture			
		0							
		0							
	R-14	0	4.40/5.00	100					675
		0				Silty dolostone, light olive gray (5Y6/1) to light gray (N7), faintly banded.			

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent Main Plant		Easting: 193943'	Well No: LA-04
Project Site: Continental Steel		Northing: 1904305'	Project No: 6802
Drilled: 06/07/93 - 07/09/93		Ground Elevation: 793.35'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core		Contractor: Burlington	Rig: Gus Pech
Riser: type: PVC	dia: 1.50" from: -2.1' to: 36.80'	Borehole Diameter: 7.88"	Total Depth: 129.00'
Monitoring Zones:		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250"	dia: 1.50" from: 36.80' to: 48.80'	Measuring Point: 795.48'	Completion Depth: 124.80'
type: Port size: .250"	dia: 1.50" from: 51.80' to: 63.80'	Water Level Elevation: 782.71'	Sheet 5 of 5
type: Port size: .250"	dia: 1.50" from: 108.80' to: 129.00'		
Casing: type: Steel	dia: 6.0" from: -2.25' to: 32.50'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 33.0 to 129.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
125	R-14	0 0 0				fine grained, few fossils and voids locally altered to or filled with sulfides. MISSISSINEWA FORMATION 119.0-121.0 ft: green tint			670 665 660 655 650 645
130									
135									
140									
145									

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location Park Avenue adjacent Main Plant		Easting: 193731'	Well No: UA-05
Project Site: Continental Steel		Northing: 1903395'	Project No: 6802
Drilled 06/23/93 - 07/17/93		Ground Elevation: 792.77'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC	dia: 1.50" from: -2.8' to: 50.20'	Borehole Diameter: 7.88"	Total Depth: 131.00'
		Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 50.20' to: 62.20'		Measuring Point: 795.62'	Completion Depth: 126.20'
type: Port size: .250" dia: 1.50" from: 65.20' to: 77.20'		Water Level Elevation: 783.55'	Sheet 1 of 5
type: Port size: .250" dia: 1.50" from: 80.20' to: 97.20'		Remarks: Borehole diameter from 0 to 37.0 ft. is 13.0 in. and from 48.0 to 131.0 ft. is 4.2 in.	
type: Port size: .250" dia: 1.50" from: 110.20' to: 131.00'			
Casing: type: Steel	dia: 6.0" from: -3.34' to: 47.00'		

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						OVERBURDEN (See UA-12 Boring Log for details from 0 to 48.7 ft. below ground surface)			790
5									785
10									780
15						14 ft: Auger refusal in till; rotary drilling through glacial till to 35.0 ft., then advanced augers.			775
20									770
25									765

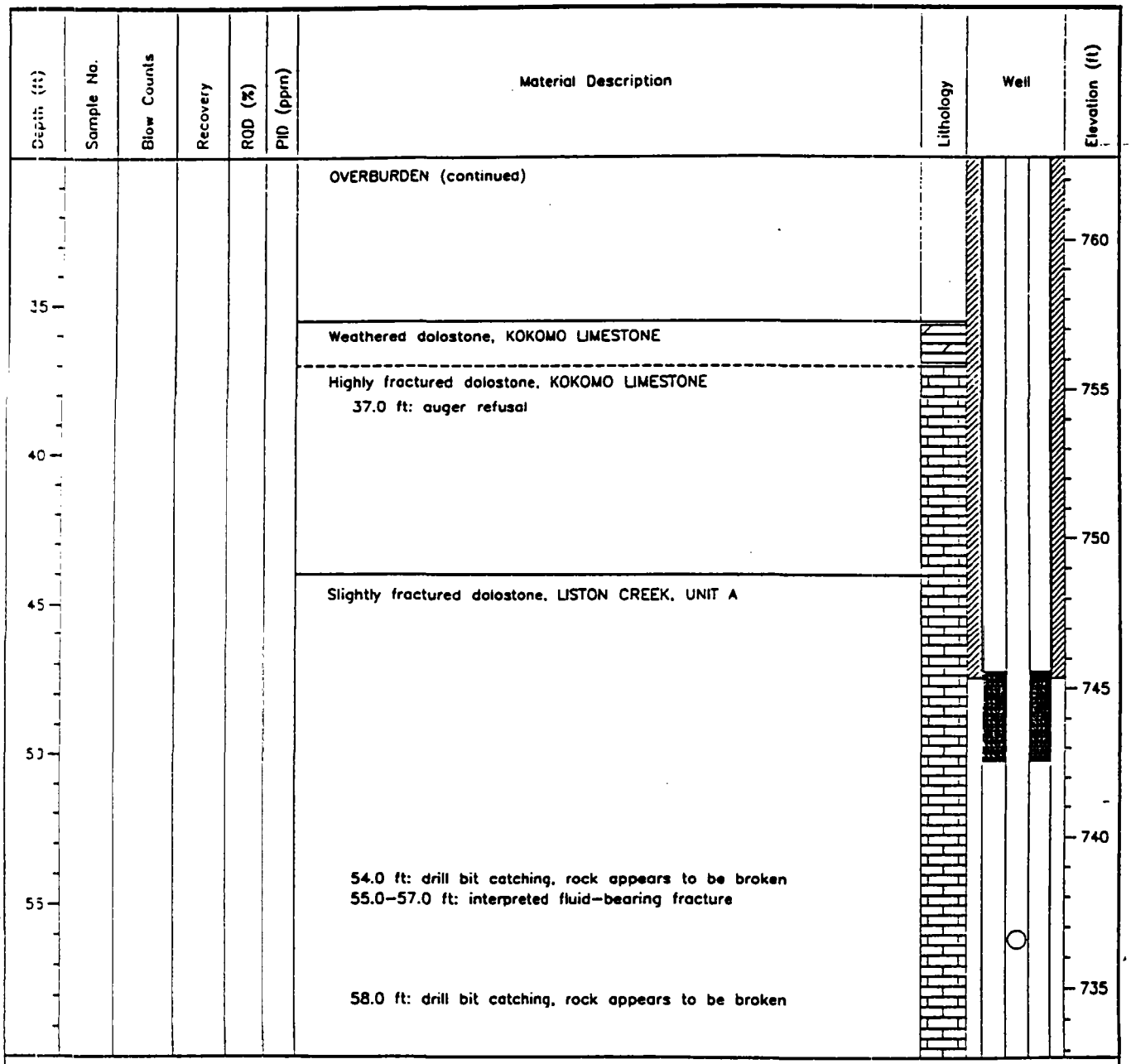
NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent Main Plant	Easting: 193731'	Well No: CA-05
Project Site: Continental Steel	Northing: 1903395'	Project No: 6802
Drilled: 06/23/93 - 07/17/93	Ground Elevation: 792.77'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.8' to: 50.20'	Borehole Diameter: 7.88"	Total Depth: 131.20'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 50.20' to: 62.20' type: Port size: .250" dia: 1.50" from: 65.20' to: 77.20' type: Port size: .250" dia: 1.50" from: 80.20' to: 97.20' type: Port size: .250" dia: 1.50" from: 110.20' to: 131.00'	Logged By: K. Hewitt	Checked By: D. Walsh
	Measuring Point: 795.62'	Completion Depth: 126.20'
	Water Level Elevation: 783.55'	Sheet 2 of 5
Casing: type: Steel dia: 6.0" from: -3.34' to: 47.00'	Remarks: Borehole diameter from 0 to 37.0 ft. is 13.0 in. and from 48.0 to 131.0 ft. is 4.2 in.	



NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent Main Plant	Easting: 193731'	Well No: LA-05
Project Site: Continental Steel	Northing: 1903395'	Project No: 6802
Drilled: 06/23/93 - 07/17/93	Ground Elevation: 792.77'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.8' to: 50.20'	Borehole Diameter: 7.88"	Total Depth: 131.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 50.20' to: 62.20' type: Port size: .250" dia: 1.50" from: 65.20' to: 77.20' type: Port size: .250" dia: 1.50" from: 80.20' to: 97.20' type: Port size: .250" dia: 1.50" from: 110.20' to: 131.00'	Measuring Point: 795.62'	Completion Depth: 126.20'
	Water Level Elevation: 783.55'	Sheet 3 of 5
Casing: type: Steel dia: 6.0" from: -3.34' to: 47.00'	Remarks: Borehole diameter from 0 to 37.0 ft. is 13.0 in. and from 48.0 to 131.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT A (continued)			
65									730
									725
70									
									720
						LISTON CREEK, UNIT B 74.0 ft: interpreted fracture			
75									715
80									
									710
85									
									705

NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent Main Plant		Easting: 193731'	Well No: LA-05
Project Site: Continental Steel		Northing: 1903395'	Project No: 6802
Drilled: 06/23/93 - 07/17/93		Ground Elevation: 792.77'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC	dia: 1.50" from: -2.8' to: 50.20'	Borehole Diameter: 7.88"	Total Depth: 131.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 50.20' to: 62.20' type: Port size: .250" dia: 1.50" from: 65.20' to: 77.20' type: Port size: .250" dia: 1.50" from: 80.20' to: 97.20' type: Port size: .250" dia: 1.50" from: 110.20' to: 131.00'		Logged By: K. Hewitt	Checked By: D. Nash
		Measuring Point: 795.62'	Completion Depth: 126.20'
		Water Level Elevation: 783.55'	Sheet 4 of 5
Casing: type: Steel	dia: 6.0" from: -3.34' to: 47.00'	Remarks: Borehole diameter from 0 to 37.0 ft. is 13.0 in. and from 48.0 to 131.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT B (continued)			
						93 ft: possible fracture			
95									700
100									695
105									690
110									685
						MISSISSINEWA FORMATION			680
115									675

NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Park Avenue adjacent Main Plant		Easting: 193731'	Well No: LA-05
Project Site: Continental Steel		Northing: 1903395'	Project No: 6802
Drilled: 06/23/93 - 07/17/93		Ground Elevation: 792.77'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC	dia: 1.50" from: -2.8' to: 50.20'	Borehole Diameter: 7.88"	Total Depth: 131.00'
Monitoring Zones		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250"	dia: 1.50" from: 50.20' to: 62.20'	Measuring Point: 795.62'	Completion Depth: 126.20'
type: Port size: .250"	dia: 1.50" from: 65.20' to: 77.20'	Water Level Elevation: 783.55'	Sheet 5 of 5
type: Port size: .250"	dia: 1.50" from: 80.20' to: 97.20'	Remarks: Borehole diameter from 0 to 37.0 ft. is 13.0 in. and from 48.0 to 131.0 ft. is 4.2 in.	
type: Port size: .250"	dia: 1.50" from: 110.20' to: 131.00'		
Casing: type: Steel	dia: 6.0" from: -3.34' to: 47.00'		

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						MISSISSINEWA FORMATION (continued) 121.0-131.0 ft: easier drilling			
125									670
130									665
135									660
140									655
145									650
									645

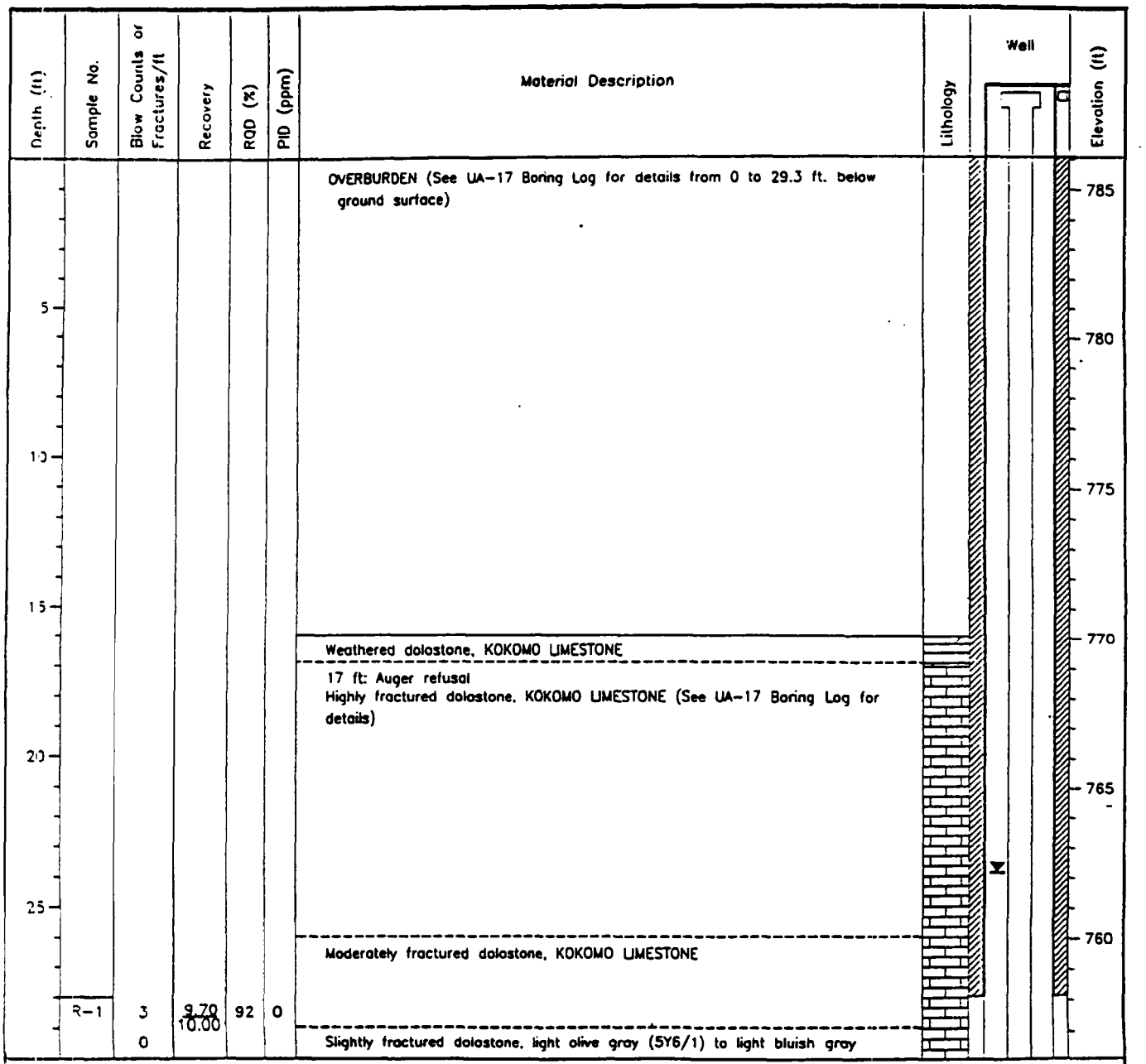
NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area	Easting: 189971'	Well No: UA-06
Project Site: Continental Steel	Northing: 1904277'	Project No: 6202
Drilled: 06/10/93 - 07/06/93	Ground Elevation: 786.09'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: Gus Pech
Riser: type: PVC dia: 1.50" from: -1.9' to: 38.40'	Borehole Diameter: 7.88"	Total Depth: 118.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 38.40' to: 50.40' type: Port size: .250" dia: 1.50" from: 53.40' to: 65.40' type: Port size: .250" dia: 1.50" from: 98.40' to: 118.00'	Measuring Point: 788.02'	Completion Depth: 114.40'
	Water Level Elevation: 762.36'	Sheet 1 of 4
Casing: type: Steel dia: 6.0" from: -2.14' to: 27.80'	*Remarks: Borehole diameter from 0 to 17.0 ft. is 13.0 in. and from 28.0 to 118.0 ft. is 4.2 in.*	



NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area		Easting: 189971'	Well No. BA-08
Project Site: Continental Steel		Northing: 1904277'	Project No: 6802
Drilled: 06/10/93 – 07/06/93		Ground Elevation: 786.09'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core		Contractor: Burlington	Rig: Gus Pecn
Riser: type: PVC	dia: 1.50" from: −1.9' to: 38.40'	Borehole Diameter: 7.88"	Total Depth: 118.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 38.40' to: 50.40'		Logged By: K. Hewitt	Checked By: D. Maisn
type: Port size: .250" dia: 1.50" from: 53.40' to: 65.40'		Measuring Point: 788.02'	Completion Depth: 114.40'
type: Port size: .250" dia: 1.50" from: 98.40' to: 118.00'		Water Level Elevation: 762.36'	Sheet 2 of 4
Casing: type: Steel	dia: 6.0" from: −2.14' to: 27.80'	Remarks: Borehole diameter from 0 to 17.0 ft. is 13.0 in. and from 28.0 to 118.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
		0				(5B7/1), fine grained, moderately laminated, locally pitted and stylolitic, KOKOMO LIMESTONE			755
		0				28.7–29.0 ft: 0/T/C/PL/S			
		1				32.8 ft: 0/T/C/PL/SR yellowish gray (5Y8/1)			
		1				33.7 ft: 0/0/Ca/PL/SR			
35		0							
		0							750
		0							
		1							
	R-2	0	9.70/10.00	84	0	38.4–38.6 ft: 45/0/C/CP/S			
		0				38.4–43.8 ft: banded yellowish gray (5Y8/1) and bluish white (5B9/1)			
40		0							
		0							745
		1				41.7–42.3 ft: 90/H/Ca/PL/S			
		1				43–50 ft: interpreted fluid-bearing fracture zone			
		0				43.2–43.5 ft: 0/T/C/PL/S			
		1				43.8–45.0 ft: medium light gray (N60)			
		0				44–118 ft: total loss of fluid circulation during Nx rock coring			
45		0				44.6–45.0 ft: 0.75/T/C/PL.CP/S			
		0				Slightly fractured dolostone, banded yellowisn gray (5Y8/1) and bluish white (5B9/1) fine grained, indistinct and contorted laminae, fossiliferous, LISTON CREEK, UNIT A			740
		2							
	R-3	1	9.80/10.00	93		47–57 ft: total loss of fluid circulation during rotary drilling			
		0				47.2–47.4 ft: 0.50/T.0/C/CP/S			
50		0				48.0–68.0 ft: chert nodules			
		0				49.2–49.3 ft: 0/0/Fe/PL/S			
		1				51.7 ft: 45/0/C/PL/S			735
		0							
		0							
		0							
55		0							
		0							730
		0							
		0							
	R-4	0	10.00/10.00	96	0	58–63 ft: interpreted fracture zone			
		0							

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area		Easting: 189971'	Well No: LA-C8
Project Site: Continental Steel		Northing: 1904277'	Project No: 6800
Drilled: 06/10/93 - 07/06/93		Ground Elevation: 786.09'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core		Contractor: Burlington	Rig: Gus Pech
Riser: type: PVC	dia: 1.50" from: -1.9' to: 38.40'	Borehole Diameter: 7.88"	Total Depth: 118.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 38.40' to: 50.40'		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250" dia: 1.50" from: 53.40' to: 65.40'		Measuring Point: 788.02'	Completion Depth: 114.40'
type: Port size: .250" dia: 1.50" from: 98.40' to: 118.00'		Water Level Elevation: 762.36'	Sheet 3 of 4
Casing: type: Steel	dia: 6.0" from: -2.14' to: 27.80'	Remarks: Borehole diameter from 0 to 17.0 ft. is 13.0 in. and from 28.0 to 118.0 ft. is 4.2 in.	

Depth (ft)	Sample No	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
		0				Slightly fractured dolostone, LISTON CREEK, UNIT A (continued)			725
65		0							
		1				66.0-66.2 ft: 85/T/C/ST/SR			720
	R-5	0	9.80/10.00	95					
70		0							715
		0							
75		0							
		1				76.9 ft: 0/0/CL/PL/SR			710
	R-6	1	10.00/10.00	100		Slightly fractured limestone, light gray (N70) to light olive gray (5Y6/1) with depth, medium to fine grained, contorted and irregular laminae, medium gray (N50) chert nodules, few fossils altered to sulfides, LISTON CREEK, UNIT B			
80		0				77.5 ft: 0/0/C/PL/S			705
		1				79.6 ft: 40/T/C/ST/SLK			
		0							
85		0							700
		0							
	R-7	0	10.00/10.00	100		88.0-107.0 ft: few mineralized (sulfide) voids, stylolites			

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Slag Processing Area	Easting: 139971'	Well No: LA-04
Project Site: Continental Steel	Northing: 1904277'	Project No: 6803
Drilled: 06/10/93 – 07/06/93	Ground Elevation: 786.09'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: Gus Pech
Riser: type: PVC dia: 1.50" from: −1.9' to: 38.40'	Borehole Diameter: 7.88"	Total Depth: 118.00'
	Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 38.40' to: 50.40' type: Port size: .250" dia: 1.50" from: 53.40' to: 65.40' type: Port size: .250" dia: 1.50" from: 98.40' to: 118.00'	Measuring Point: 788.02'	Completion Depth: 114.40'
	Water Level Elevation: 762.36'	Sheet 4 of 4
Casing: type: Steel dia: 6.0" from: −2.14' to: 27.80'	Remarks: Borehole diameter from 0 to 17.0 ft. is 13.0 in. and from 28.0 to 118.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
		0				Slightly fractured limestone, LISTON CREEK, UNIT B (continued)			695
		0							
		0							
		0							
		0							
95		1				95.1 ft: 0/0/CL/PL/SR			
		0							690
		0							
	R-8	0	5.00/5.00	100		R-8 retrieved 1.8 ft. of core from R-7			
		0							
100		0							
		0				101–108 ft: interpreted fracture zone			685
		1							
	R-9	0	5.00/5.00	100		102.8 ft: 0/0/CL/PC/SR			
		0							
105		1				105.4 ft: 0/0/Fe/ST/SR			
		0							680
		1				Silty dolostone, light olive gray (5Y6/1), fine grained, faintly banded, few fossils and voids locally altered to or filled with sulfides, MISSISSINEWA FORMATION			
	R-10	0	4.90/5.00	100		107.1 ft: 0/0/C/PL/SR			
110		0				107.5 ft: gradual color change to greenish gray (5GY6/1)			
		0							675
		0							
	R-11	0	5.00/5.00	100					
		0							
115		0							
		0							670
		0							

NOTE: Rock colors are based on Rock-Color Chart.

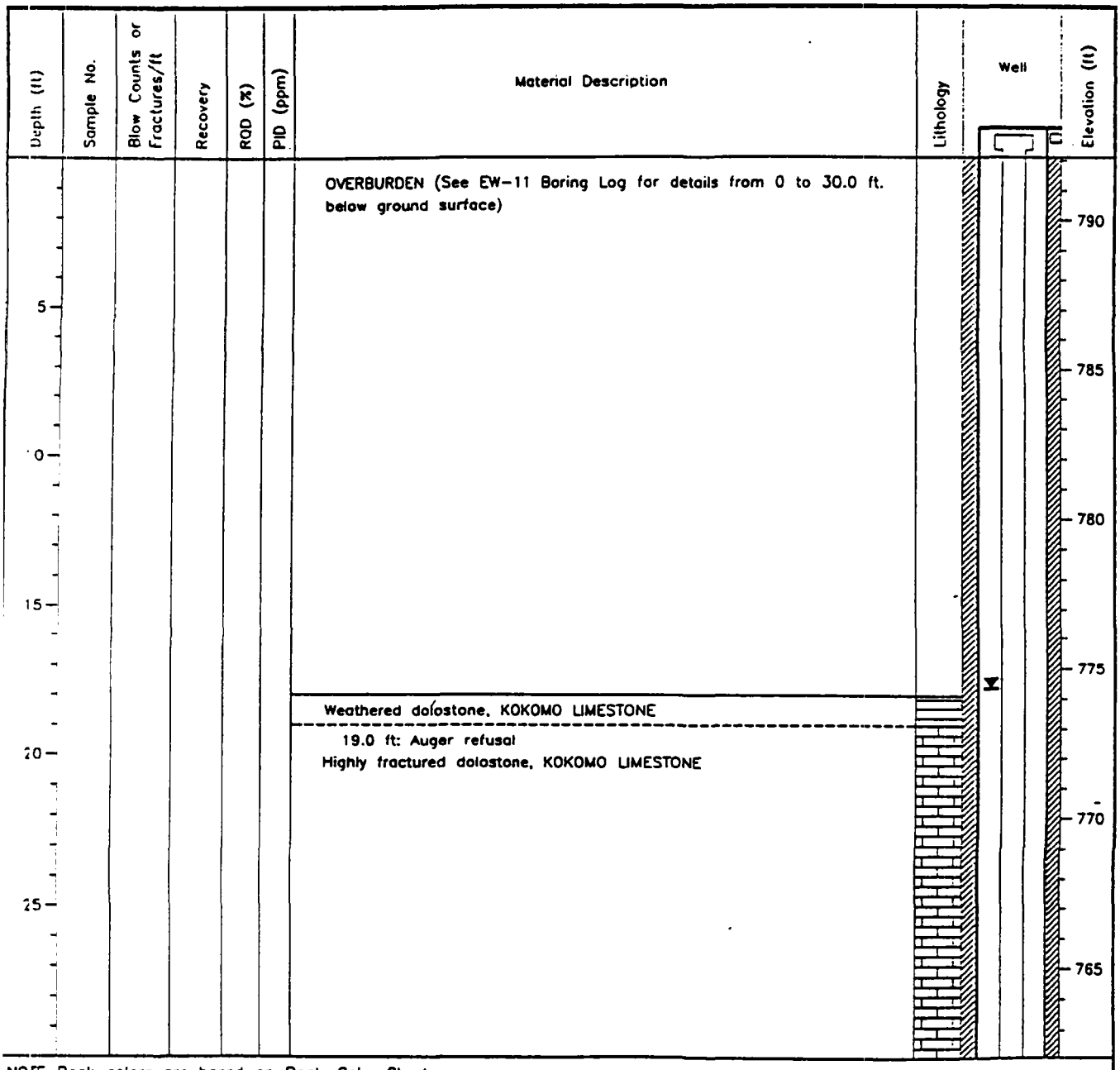
Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Lagoons	Easting: 191542'	Well No: LA-07
Project Site: Continental Steel	Northing: 1902814'	Project No: 6302
Drilled: 06/30/93 - 07/19/93	Ground Elevation: 792.10'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -0.5' to: 48.30'	Borehole Diameter: 7.88"	Total Depth: 121.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 48.30' to: 60.30' type: Port size: .250" dia: 1.50" from: 63.30' to: 75.30' type: Port size: .250" dia: 1.50" from: 78.30' to: 90.30' type: Port size: .250" dia: 1.50" from: 100.30' to: 121.00'	Logged By: K. Hewitt	Checked By: D. Walsh
	Measuring Point: 792.63'	Completion Depth: 116.30'
	Water Level Elevation: 774.30'	Sheet 1 of 5
Casing: type: Steel dia: 6.0" from: -.74' to: 37.00'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 39.0 to 121.0 ft. is 4.2 in.	



NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Lagoons		Easting: 191542'	Well No: LA-07
Project Site: Continental Steel		Northing: 1902814'	Project No: 6832
Drilled: 06/30/93 - 07/19/93		Ground Elevation: 792.10'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core		Contractor: Burlington	Rig: CME 75
Riser: type: PVC	dia: 1.50" from: -0.5' to: 48.30'	Borehole Diameter: 7.88"	Total Depth: 121.00'
Monitoring Zones		Logged By: K. Hewitt	Checked By: C. Walsh
type: Port size: .250"	dia: 1.50" from: 48.30' to: 60.30'	Measuring Point: 792.63'	Completion Depth: 116.30'
type: Port size: .250"	dia: 1.50" from: 63.30' to: 75.30'		
type: Port size: .250"	dia: 1.50" from: 78.30' to: 90.30'	Water Level Elevation: 774.30'	Sheet 2 of 5
type: Port size: .250"	dia: 1.50" from: 100.30' to: 121.00'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 39.0 to 121.0 ft. is 4.2 in.	
Casing: type: Steel	dia: 6.0" from: -.74' to: 37.00'		

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description
	R-1	1	4.32/4.50	30		Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted. KOKOMO LIMESTONE
		1				
		2				
		1				
		0				30.6 ft: 0/T/C/P/S
35	R-2	0	5.50/5.50	100		30.6-33.5 ft: 90/H,T/Fe,Ca/P/SR
		0				31.8 ft: 0/0/Fe,CL/P/S
		1				Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE
		2				
		0				38.0 ft: 0/T/C/P/SR
40						38.8-38.9 ft: 0/T/C/P/S
						Slightly fractured dolostone, KOKOMO LIMESTONE
45						
50						
						Slightly fractured dolostone, LISTON CREEK, UNIT A
						54.0 ft: interpreted fluid-bearing fracture
55						

Lithology | Well | Elevation (ft): 760, 755, 750, 745, 740, 735

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Lagoons	Easting: 191542'	Well No: LA-07
Project Site: Continental Steel	Northing: 1902814'	Project No: 6802
Drilled 06/30/93 - 07/19/93	Ground Elevation: 792.10'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -0.5' to: 48.30'	Borehole Diameter: 7.88"	Total Depth: 121.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 48.30' to: 60.30'; type: Port size: .250" dia: 1.50" from: 63.30' to: 75.30'; type: Port size: .250" dia: 1.50" from: 78.30' to: 90.30'; type: Port size: .250" dia: 1.50" from: 100.30' to: 121.00'	Logged By: K. Hewitt	Checked By: D. Walsh
	Measuring Point: 792.63'	Completion Depth: 116.30'
	Water Level Elevation: 774.30'	Sheet 3 of 5
Casing: type: Steel dia: 6.0" from: -.74' to: 37.00'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 39.0 to 121.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT A (continued)			
						60 ft: some loss of fluid circulation			730
65									
						67–69 ft: interpreted fluid-bearing fracture zone			725
70									
									720
75									
									715
80						80–81 ft: interpreted fracture zone			
									710
85						LISTON CREEK, UNIT B			
									705

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location Lagoons	Easting: 191542'	Well No: LA-07
Project: Site: Continental Steel	Northing: 1902814'	Project No: 6802
Drilled 06/30/93 – 07/19/93	Ground Elevation: 792.10'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core	Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: −0.5' to: 48.30'	Borehole Diameter: 7.88"	Total Depth: 121.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 48.30' to: 60.30' type: Port size: .250" dia: 1.50" from: 63.30' to: 75.30' type: Port size: .250" dia: 1.50" from: 78.30' to: 90.30' type: Port size: .250" dia: 1.50" from: 100.30' to: 121.00'	Logged By: K. Hewitt	Checked By: D. Walsh
	Measuring Point: 792.63'	Completion Depth: 116.30'
	Water Level Elevation: 774.30'	Sheet 4 of 5
Casing: type: Steel dia: 6.0" from: −.74' to: 37.00'	Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 39.0 to 121.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT B (continued)			700
95									695
100						102–121 ft: near total loss of fluid circulation			690
105									685
110									680
						MISSISSINEWA FORMATION			
115									675

NOTE: Rock colors are based on Rock-Color Chart.

Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Lagoons		Easting: 191542'	Well No: LA-07
Project Site: Continental Steel		Northing: 1902814'	Project No: 6802
Drilled: 06/30/93 - 07/19/93		Ground Elevation: 792.10'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary/Nx Rock Core		Contractor: Burlington	Rig: CME 75
Riser: type: PVC	dia: 1.50" from: -0.5' to: 48.30'	Borehole Diameter: 7.88"	Total Depth: 121.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 48.30' to: 60.30'		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250" dia: 1.50" from: 63.30' to: 75.30'		Measuring Point: 792.63'	Completion Depth: 116.30'
type: Port size: .250" dia: 1.50" from: 78.30' to: 90.30'		Water Level Elevation: 774.30'	Sheet 5 of 5
type: Port size: .250" dia: 1.50" from: 100.30' to: 121.00'		Remarks: Borehole diameter from 0 to 19.0 ft. is 13.0 in. and from 39.0 to 121.0 ft. is 4.2 in.	
Casing: type: Steel	dia: 6.0" from: -.74' to: 37.00'		

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						MISSISSINEWA FORMATION (continued)			670
125									665
130									660
135									655
140									650
145									645

NOTE: Rock colors are based on Rock-Color Chart.

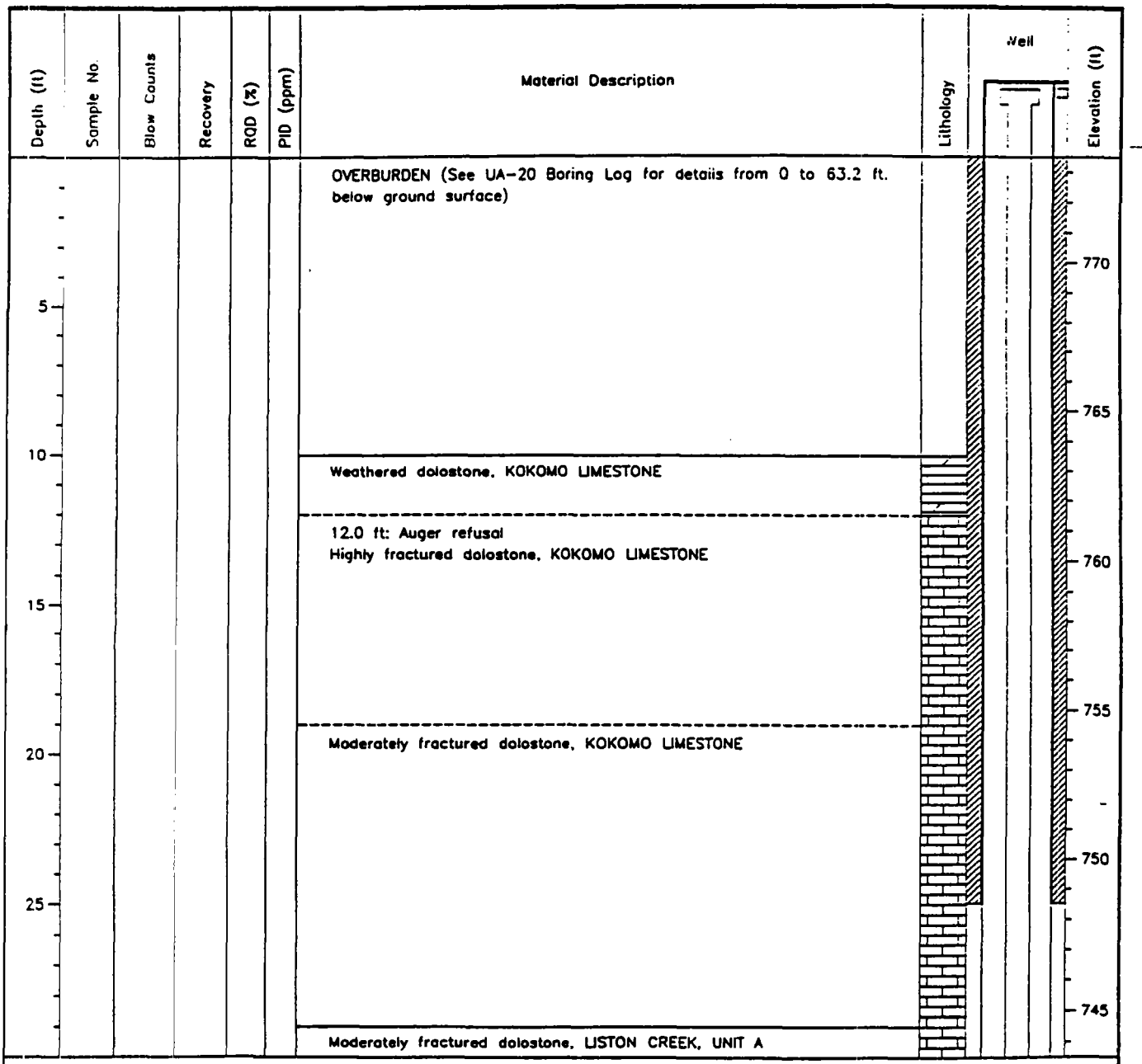
Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs, rock core, and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Quarry		Easting: 188586'	Well No: UA-08
Project: Site: Continental Steel		Northing: 1904001'	Project No: 6802
Drilled: 06/28/93 - 07/20/93		Ground Elevation: 773.50'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.0' to: 41.90'		Borehole Diameter: 7.88"	Total Depth: 107.00'
Monitoring Zones:		Logged By: K. Hewitt	Checked By: D. Walsh
type: Port size: .250" dia: 1.50" from: 41.90' to: 53.90'		Measuring Point: 775.47'	Completion Depth: 102.90'
type: Port size: .250" dia: 1.50" from: 56.90' to: 68.90'		Water Level Elevation: 739.06'	Sheet 1 of 4
type: Port size: .250" dia: 1.50" from: 71.90' to: 88.90'			
Casing: type: Steel dia: 6.0" from: -2.17' to: 25.00'		Remarks: Borehole diameter from 0 to 12.0 ft. is 13.0 in. and from 25.0 to 107.0 ft. is 4.2 in.	



NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Quarry		Easting: 188586'	Well No: LA-08
Project Site: Continental Steel		Northing: 1904001'	Project No: 6802
Drilled: 06/28/93 - 07/20/93		Ground Elevation: 773.50'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary		Contractor: Burlington	Rig: CME 75
Riser: type: PVC dia: 1.50" from: -2.0' to: 41.90'		Borehole Diameter: 7.88"	Total Depth: 107.00'
		Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 41.90' to: 53.90' type: Port size: .250" dia: 1.50" from: 56.90' to: 68.90' type: Port size: .250" dia: 1.50" from: 71.90' to: 88.90'		Measuring Point: 775.47'	Completion Depth: 102.90'
		Water Level Elevation: 739.06'	Sheet 2 of 4
Casing: type: Steel dia: 6.0" from: -2.17' to: 25.00'		Remarks: Borehole diameter from 0 to 12.0 ft. is 13.0 in. and from 25.0 to 107.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						Moderately fractured dolostone, LISTON CREEK, UNIT A (continued)			
						Slightly fractured dolostone, LISTON CREEK, UNIT A			
35									740
40									735
45									730
						48 ft: interpreted fracture			725
50									720
55									715

NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Quarry		Easting: 188586'	Well No: LA-08
Project Site: Continental Steel		Northing: 1904001'	Project No: 6802
Drilled: 06/28/93 - 07/20/93		Ground Elevation: 773.50'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary		Contractor: Burlington	Rig: CME 75
Riser: Type: PVC	dia: 1.50" from: -2.0' to: 41.90'	Borehole Diameter: 7.88".	Total Depth: 107.00'
		Logged By: K. Hewitt	Checked By: D. Walsh
Monitoring Zones: Type: Port size: .250" dia: 1.50" from: 41.90' to: 53.90' Type: Port size: .250" dia: 1.50" from: 56.90' to: 68.90' Type: Port size: .250" dia: 1.50" from: 71.90' to: 88.90'		Measuring Point: 775.47'	Completion Depth: 102.90'
		Water Level Elevation: 739.06'	Sheet 3 of 4
Casing: Type: Steel	dia: 6.0" from: -2.17' to: 25.00'	Remarks: Borehole diameter from 0 to 12.0 ft. is 13.0 in. and from 25.0 to 107.0 ft. is 4.2 in.	

Depth (ft)	Sample No.	Blow Counts	Recovery	RQD (%)	PID (ppm)	Material Description	Lithology	Well	Elevation (ft)
						LISTON CREEK, UNIT A (continued) 61 ft: interpreted fracture			
65									710
						68-72 ft: total loss of fluid circulation			705
70									
						LISTON CREEK, UNIT B			700
75						75 ft: possible fracture			
						77-80 ft: total loss of fluid circulation			695
80									
						82 ft: interpreted fracture			690
						84 ft: brief loss of fluid circulation			
85									685

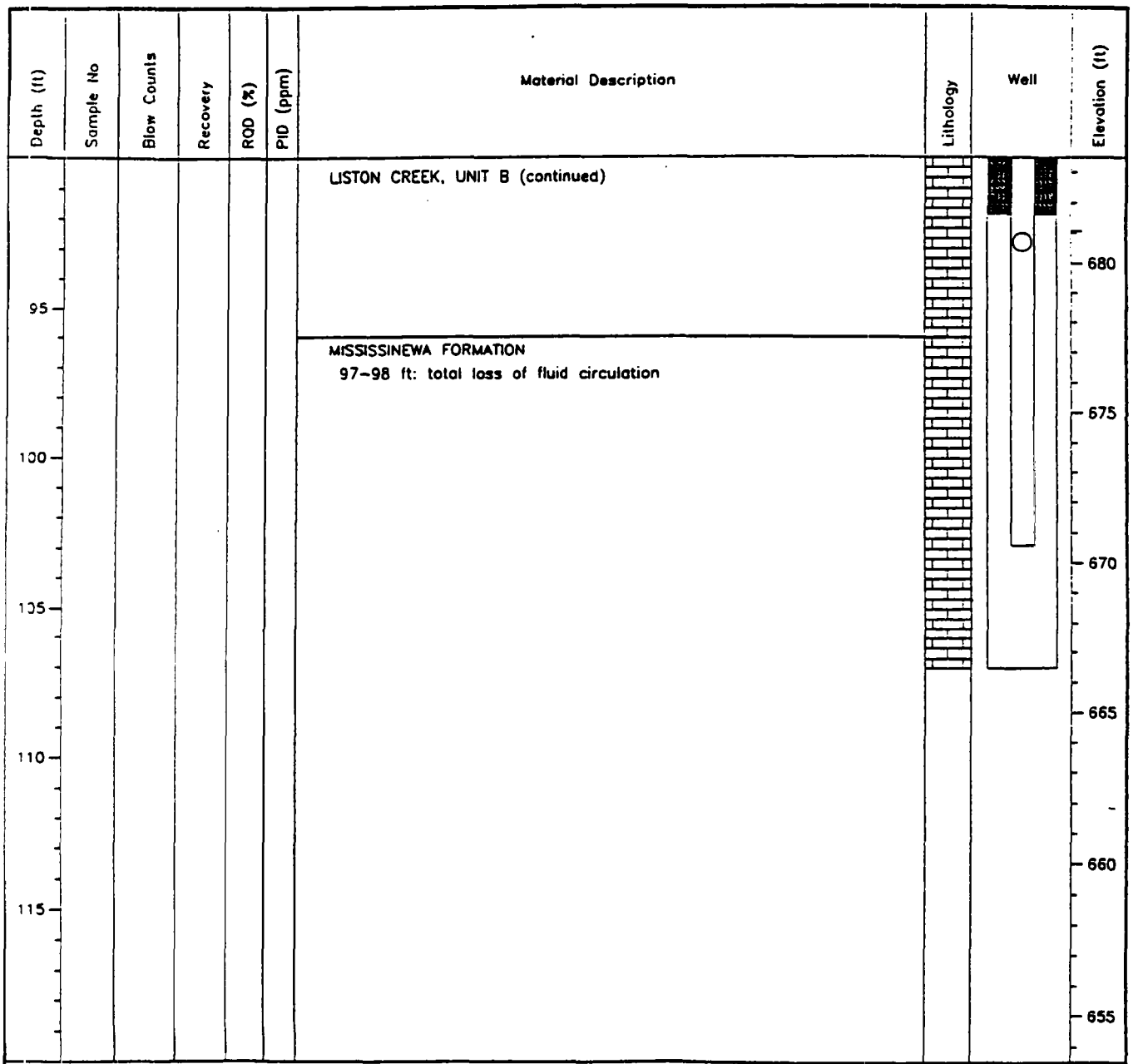
NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Dixon Quarry	Easting: 188586'	Well No: LA-08
Project: Site: Continental Steel	Northing: 1904001'	Project No: 6802
Drilled: 06/28/93 - 07/20/93	Ground Elevation: 773.50'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Rotary	Contractor: Burlington	Rig: CME 75
Riser type: PVC dia: 1.50" from: -2.0' to: 41.90'	Borehole Diameter: 7.88"	Total Depth: 107.00'
Monitoring Zones: type: Port size: .250" dia: 1.50" from: 41.90' to: 53.90' type: Port size: .250" dia: 1.50" from: 56.90' to: 68.90' type: Port size: .250" dia: 1.50" from: 71.90' to: 88.90'	Logged By: K. Hewitt	Checked By: D. Walsh
	Measuring Point: 775.47'	Completion Depth: 102.90'
	Water Level Elevation: 739.06'	Sheet 4 of 4
Casing: type: Steel dia: 6.0" from: -2.17' to: 25.00'	Remarks: Borehole diameter from 0 to 12.0 ft. is 13.0 in. and from 25.0 to 107.0 ft. is 4.2 in.	



NOTE: Formation contacts, fracture zones, and individual fractures are interpreted from borehole geophysical logs and/or adjacent borings.

A monitoring zone consists of an upper packer, a pumping port, a measuring port, and a lower packer.

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

Well Location: Lindsay Street	Easting: '95036'	Well No: OW-3'
Project Site: Continental Steel	Northing: 1905564'	Project No: 6802
Drilled: 09/15/93 - 09/15/93	Ground Elevation: 795.36'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core/Rotary	Contractor: MATECO	Rig: CME 75
Riser: type: PVC dia: 2.00" from: 0.4' to: 7.00'	Borehole Diameter: 4.00"	Total Depth: 22.00'
	Logged By: R. Nelson	Checked By: D. Walsh
Screen: type: Slotted size: .010" dia: 2.00" from: 7.00' to: 22.00'	Measuring Point: 795.00'	Completion Depth: 22.00'
	Water Level Elevation: 786.56'	Sheet 1 of 1
Annular Fill: type: Bentonite from: 3.00' to: 5.00'; type: #3 Global Sand from: 5.00' to: 22.00'; type: from: to:	Remarks: Borehole diameter from 3.0 to 22.0 ft. is 3.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description	Lithology	Well	Elevation (ft)
0	S-1	3 2 2 2 2 2	0.30 / 2.00		0		Clay, some sand and gravel, soft, moist, brown, FILL (CL)			795
	S-2	2 2 30/2"	0.60 / 1.20		0		Weathered dolostone, KOKOMO LIMESTONE			
5	R-1	x x	0.50 / 2.50	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE			790
	R-2	>10 x x	1.50 / 5.00	0			4.0-12.0 ft: */0,T/C,Fe/W,PL/SR			
10	R-3	x 6 x 4 5	4.00 / 5.00	46			11.8-12.3 ft: 90/H/Ca/W/-			785
		1 3					13.3 ft: 0/T/Fe,CL/PL/S			
15	R-4	1 0 0 1 1	5.00 / 5.00	52			14.6-16.5 ft: pitted and petroliferous			780
							Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE			
20							16.5-21.5 ft: pitted and petroliferous 16.5-16.9 ft: 0.90/0,T/CL/PL/S 19.4-21.5 ft: 90/T/C,CL/W/SR			775
25										770

Note: Rock colors are based on Rock-Color Chart.
Borehole was reamed from 21.5' to 22.0'.

BORING AND WELL INSTALLATION LOG
ABB Environmental Services, Inc.

Well Location Lindsay Street	Easting: '95049'	Well No: PW-01
Project Site: Continental Steel	Northing: 1905407'	Project No: 5802
Drilled: 09/14/93 - 09/14/93	Ground Elevation: 796.15'	Datum: Mean Sea Level
Drilling Method: Hollow Stem Auger/Nx Rock Core	Contractor: MATECO	Rig: CME 75
Riser: type: PVC dia: 5.00" from: 0.4' to: 8.00'	Borehole Diameter: 8.00"	Total Depth: 25.50'
	Logged By: R. Nelson	Checked By: D. Walsh
Screen: type: Slotted size: .060" dia: 5.00" from: 8.00' to: 23.00'	Measuring Point: 795.76'	Completion Depth: 23.00'
	Water Level Elevation: 787.75'	Sheet 1 of 1
Annular Fill: type: Bentonite from: 3.00' to: 6.00'; type: #3 Global Sand from: 6.00' to: 23.00'; type: from: to:	Remarks: Borehole diameter from 5.0 to 23 ft. is 7.25 in. Borehole diameter from 23 ft. to 25.5 ft. is 2.9 in.	

Depth (ft)	Sample No.	Blow Counts or Fractures/ft	Recovery	RQD (%)	PID (ppm)	Lab Sample	Material Description
	S-1	3 4 4 5	1.50/2.00		0		Clay, firm, slightly moist, brown, FILL (CL)
	S-2	5 7 9 11	0.30/2.00		0		
	S-3	50/3	0.20/0.20		0		
5							Weathered dolostone, KOKOMO LIMESTONE
	R-1	x 4	2.00/4.00	0			Highly fractured dolostone, alternating layers of massive and laminated dolostone. Massive dolostone is yellowish gray (5Y8/1) near top of rock and bluish white (5B9/1) at depth, and contains some high angle and 0° fractures which are often iron-stained and occasionally clay-bearing. Laminated dolostone is bluish white (5B9/1) and olive gray (5Y4/1), often breaks easily along near-horizontal bedding, and is very often petroliferous, olive black (5Y2/1), and pitted, KOKOMO LIMESTONE
10	R-2	>10 3 4 1 1 3	4.50/5.00	60			6.5-6.8 ft: 0.45/0/CL,Fe/W,ST/SR,R 7.2-9.0 ft: 0/0/C/PL,W/SR 8.4 ft: 0/0/Fe,CL/PL/S 10.5-11.3 ft: 0/0/C/W/SR 90/H/Ca/W/-
15	R-3	2 0 0 0 0 0	5.00/5.00	100			Moderately fractured dolostone, yellowish gray (5Y8/1), generally massive, locally laminated, competent, KOKOMO LIMESTONE 12.1-13.2 ft: sparsely petroliferous 14.4-15.3 ft: 0.85/H,T/Ca,Fe/W/SR 16.7-23.3 ft: pitted and petroliferous
20	R-4	0 1 0 1 0	5.00/5.00	80			22.7-23.2 ft: 0/T/C/PL/S
25							25.1-25.6 ft: pitted

Lithology / Well / Elevation (ft): 795, 790, 785, 780, 775, 770

BORING AND WELL INSTALLATION LOG

ABB Environmental Services, Inc.

APPENDIX G

Slug Test Analysis and Results

Appendix G
Slug Test Analysis and Results
Table of Contents

Appendix G
Slug Test Analysis and Results

1 Purpose

Slug tests were performed on monitoring wells installed by CDM (1995a) to obtain hydraulic conductivity values for use in groundwater flow and contaminant transport modeling and for comparison with previously determined hydraulic conductivities.

1.1 Methodology

Slug tests were conducted following the procedures outlined in Procedure G of the Continental Steel Superfund Site Phase II Field Sampling Plan (FSP) (CDM 1995b). Rising and falling head slug tests were performed in 10 monitoring wells installed by CDM during the Phase II RI/FS field investigation conducted in Fall 1995. Monitoring wells UA-32 and UA-105 are screened in the shallow water-bearing zone, LA-101C, LA-102C, LA-105C, LA-106C and LA-107C are screened in the intermediate water-bearing zone, and LA-104E, LA-105E and LA-107E are screened in the lower water-bearing zone. The location of the monitoring wells are shown on **Figure 2-1.**

Equipment used for the slug tests include a data logger (Hermit Models SE1000C and SE2000C) and pressure transducer (Hermit Model PXD-260) capable of withstanding pressures up to 30 psi. The slugs consisted of 3- or 4- foot length, 1.25-inch diameter PVC rod that was attached to clean polypropylene rope. A dedicated slug and rope assembly was used in each monitoring well to prevent cross-contamination. Data collection was terminated after at least 90% recovery of the water level change induced by the slug. Data files were downloaded from the data logger to a portable computer and a quality check was performed by graphically viewing the time vs. drawdown plots in the field. The slug test was performed again if indicated by the field quality check.

Slug tests were not conducted or analyzed for wells LA-03E, LA-03C, LA-103C and LA-03A.

Slug tests were not done in wells LA-03E and LA-103C because their water levels did not equilibrate over a 45 hour period. Water level measurements collected during this period indicated continuously rising water levels in the wells. In addition, well LA-03C was not tested because it had less than a foot of water which was insufficient to perform a slug test. The water level in LA-03A recovered too fast to capture enough usable data to analyze.

1.2 Analysis And Results

The time vs. drawdown data were analyzed in the office with the Bouwer and Rice method using commercially available software (AQTESOLV Version 2.1 by Geraghty and Miller). This method was used for both unconfined and confined aquifer conditions per Bouwer (1989). Input parameters for the data analysis are given in **Table 1**. Curve fitting was done visually and emphasis was placed on the early time data (i.e., drawdowns greater than 0.1 feet). The positive and negative drawdown fluctuations at the beginning of a test were not used in the analysis because these data points do not represent the natural recovery of the water level. Instead, these data points reflect water level fluctuations that occurred while the slug was being lowered or removed. Only those points representing the natural recovery of the water level were used in the data analysis.

Thickness of the stratigraphic units was determined from boring logs for wells used in the slug test analysis. The depth of the contact between the Liston Creek Limestone and the Mississinewa Shale was taken as the total thickness of the aquifer. For the lower water-bearing zone monitoring wells (those with an "E" suffix), the thickness of the aquifer was equated to the bottom of the screen for that particular well. For well LA-104E the thickness of the aquifer was extended so the saturated thickness was larger than the static water level in the well. Once the aquifer thickness was determined, the saturated thickness of the aquifer was calculated. The data used to calculate saturated thickness are summarized in **Table 2**.

Results of the slug test analysis for the monitoring wells installed by CDM (1995a) are listed in **Table 3**, along with hydraulic conductivity values obtained by ABB-ES (see **Appendix I**). In addition, **Table 3** lists the geometric mean of the falling and rising head hydraulic conductivity values. **Figures 1** to **4** are the time vs. drawdown plots from AQTESOLV for the shallow water-bearing zone monitoring wells (UA-32 and UA-105). The time vs. drawdown plots for the intermediate water-bearing zone are shown on **Figures 5** to **14**. The lower water-bearing zone time vs. drawdown plots are shown on **Figures 15** to **20**. Raw data supporting **Figures 1** through **20** is available in project files. **Figure 21** shows the variation in hydraulic conductivity with elevation of the screened interval. The stratigraphic contacts shown in **Figure 21** are approximated and are based on boring logs of the lower water-bearing zone wells.

Hydraulic conductivity varies spatially across the site. The overall trend for hydraulic conductivity is an increase in value to the west. Hydraulic conductivity values in Markland Avenue Quarry are relatively consistent. Hydraulic conductivities for wells OW-01 and UA-06, located at the fence plant were obtained from ABB-ES pump test data (**Appendix I**). For these two wells the hydraulic conductivity value is considerably larger as is typical since pump tests evaluate a larger area of the aquifer. The largest hydraulic conductivity values are in the vicinity of the Slag Processing Area except for well UA-18. Well UA-18, near the Dixon Road Quarry, has the smallest hydraulic conductivity value. This well is located on the west side of the site (**Figure 2-1**). No vertical trends in hydraulic conductivity were observed.

1.3 References

Bouwer, H. 1989. The Bouwer and Rice Slug Test - An Update. *Groundwater.* Volume 27 #3. May-June 1989.

Camp Dresser & McKee, Inc. (CDM). 1995a. Continental Steel Superfund Site Focused RI/FS Work Plan.

Camp Dresser & McKee, Inc. (CDM). 1995b. Continental Steel Superfund Site Phase II Field Sampling Plan.

Duffield, G.M. 1995. AQTESOLV- Aquifer Test Design and Analysis Computer Software.

TABLE 1

HYDRAULIC CONDUCTIVITY DATA

CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

Well ID	Type of Test	Total Depth of Well BTOC (ft)	Depth to Water BTOC (ft)	AQTESOLV Input Parameters (ft)						Hydraulic Conductivity			
				Water Column	Well Casing Radius	Borehole Radius	Screen Length	Initial Drawdown	Saturated Thickness	(ft/min)	(ft/s)	(cm/s)	Geometric Mean (cm/s)
LA-101C	FH	92.00	18.61	73.39	0.0833	0.26	10	1.308	101	1.0 E-04	1.7 E-06	5.1 E-05	5.3 E-05
	RH	92.00	18.61	73.39	0.0833	0.26	10	1.174	101	1.1 E-04	1.8 E-06	5.6 E-05	
LA-102C	FH	64.00	16.44	47.56	0.0833	0.26	10	0.969	100	1.9 E-04	3.2 E-06	9.7 E-05	9.1 E-05
	RH	64.00	16.44	47.56	0.0833	0.26	10	0.735	100	1.7 E-04	2.8 E-06	8.6 E-05	
LA-104E	FH	138.01	67.91	70.10	0.0833	0.26	20	1.096	75	3.3 E-04	5.5 E-06	1.7 E-04	1.6 E-04
	RH	138.01	67.91	70.10	0.0833	0.26	20	1.183	75	3.1 E-04	5.2 E-06	1.6 E-04	
LA-105C	FH	72.85	40.35	32.50	0.0833	0.26	10	0.481	83	1.3 E-02	2.2 E-04	6.6 E-03	6.9 E-03
	RH	72.85	40.35	32.50	0.0833	0.26	10	1.289	83	1.4 E-02	2.3 E-04	7.1 E-03	
LA-105E	FH	127.60	67.85	59.75	0.0833	0.26	20	1.694	60	6.9 E-03	1.2 E-04	3.5 E-03	3.8 E-03
	RH	127.60	67.85	59.75	0.0833	0.26	20	1.778	60	8.2 E-03	1.4 E-04	4.2 E-03	
LA-106C	FH	72.73	30.65	42.08	0.0833	0.26	10	0.837	97	2.6 E-02	4.3 E-04	1.3 E-02	1.3 E-02
	RH	72.73	30.65	42.08	0.0833	0.26	10	0.968	97	2.5 E-02	4.2 E-04	1.3 E-02	
LA-107C	FH	80.10	49.74	30.36	0.0833	0.26	10	0.635	70	1.8 E-02	3.0 E-04	9.1 E-03	1.1 E-02
	RH	80.10	49.74	30.36	0.0833	0.26	10	1.174	70	2.4 E-02	4.0 E-04	1.2 E-02	
LA-107E	FH	125.99	64.10	61.89	0.0833	0.26	20	0.913	62	2.3 E-02	3.8 E-04	1.2 E-02	1.2 E-02
	RH	125.99	64.10	61.89	0.0833	0.26	20	1.328	62	2.6 E-02	4.3 E-04	1.3 E-02	
UA-105	FH	44.61	24.09	20.52	0.0833	0.26	10	0.826	99	9.6 E-03	1.6 E-04	4.9 E-03	4.5 E-03
	RH	44.61	24.09	20.52	0.0833	0.26	10	0.611	99	8.2 E-03	1.4 E-04	4.2 E-03	
UA-32	FH	35.90	17.82	18.08	0.0833	0.26	10	0.793	110	8.4 E-03	1.4 E-04	4.3 E-03	4.3 E-03
	RH	35.90	17.82	18.08	0.0833	0.26	10	1.005	110	8.6 E-03	1.4 E-04	4.4 E-03	

FH: falling head

RH: rising head

BTOC: *Below top of 2 in. casing*

TABLE 2
SATURATED THICKNESS DATA
CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

Well ID	TOC Elevation (ft)	GS Elevation (ft)	TOC (ft)	Thickness of Aquifer (ft)	Depth to Water (ft) TOC	Depth to Water BGS(ft)	Saturated Thickness (ft)
UA-32	798.07	795.00	35.90	125.00	17.82	14.75	110.25
UA-105	803.92	801.10	44.61	120.00	24.09	21.27	98.73
LA-105E	804.41	801.30	127.60	125.00	67.85	64.74	60.26
LA-105C	804.31	801.40	72.85	120.00	40.35	37.44	82.56
LA-101C	806.57	803.50	92.00	117.00	18.61	15.54	101.46
LA-106C	796.28	793.40	72.73	125.00	30.65	27.77	97.23
LA-104E	808.83	806.10	138.01	140.00	67.91	65.18	74.82
LA-102C	798.47	798.60	64.00	117.00	16.44	16.57	100.43
LA-107C	803.80	801.00	80.10	117.00	49.74	46.94	70.06
LA-107E	802.46	799.40	125.99	123.00	64.10	61.04	61.96

TOC: top of casing
GS: ground surface
BGS: below ground surface

TABLE 3
HYDRAULIC CONDUCTIVITY
CONTINENTAL STEEL SUPERFUND SITE, KOKOMO, INDIANA

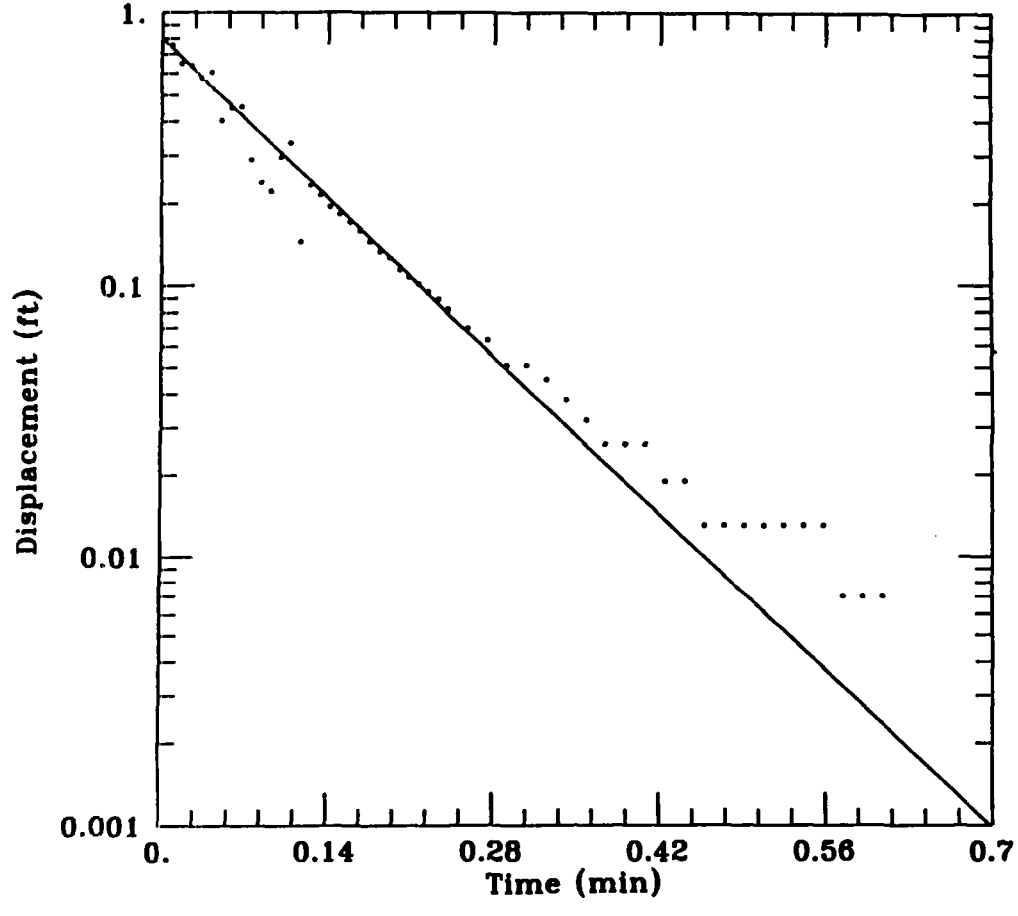
Well ID	Water-Bearing Zone	Screen Elevation (ft)[c]	Hydraulic Conductivity K (cm/s)	Origin of Data
EW-03	shallow	776-767	6.8 E-04	ABB[b]
EW-10	shallow	765-763	1.7 E-03	ABB
LA-02A	shallow	755-743	6.8 E-04	ABB
LA-03A	shallow	764-752	2.5 E-03	ABB
OW-01[a]	shallow	788-773	1.4 E-02	ABB
UA-05	shallow	797-782	6.9 E-04	ABB
UA-06[a]	shallow	790-780	6.0 E-02	ABB
UA-07	shallow	793-783	2.0 E-05	ABB
UA-105	shallow	769-759	4.5 E-03	CDM
UA-12	shallow	758-748	3.7 E-03	ABB
UA-14	shallow	767-757	5.0 E-04	ABB
UA-16	shallow	773-763	1.4 E-02	ABB
UA-18	shallow	758-738	9.4 E-07	ABB
UA-32	shallow	772-762	4.3 E-03	CDM
LA-02B	intermediate	740-728	4.4 E-05	ABB
LA-101C	intermediate	725-715	5.3 E-05	CDM
LA-102C	intermediate	744-734	9.1 E-05	CDM
LA-105C	intermediate	741-731	6.9 E-03	CDM
LA-106C	intermediate	733-723	1.3 E-02	CDM
LA-107C	intermediate	733-723	1.1 E-02	CDM
LA-02C	lower	688-668	5.2 E-04	ABB
LA-03C	lower	749-737	1.3 E-03	ABB
LA-104E	lower	693-673	1.6 E-04	CDM
LA-105E	lower	697-677	3.8 E-03	CDM
LA-107E	lower	696-676	9.4 E-03	CDM

Hydraulic Conductivity calculated from slug tests

[c] Approximated from soil boring or well boring records.

[a] Denotes that hydraulic conductivity was calcualted from a pump test.

[b] ABB-ES results found in **Appendix I** of CDM, 1996 RI report.



DATA SET:
UA32FH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 19, 1996

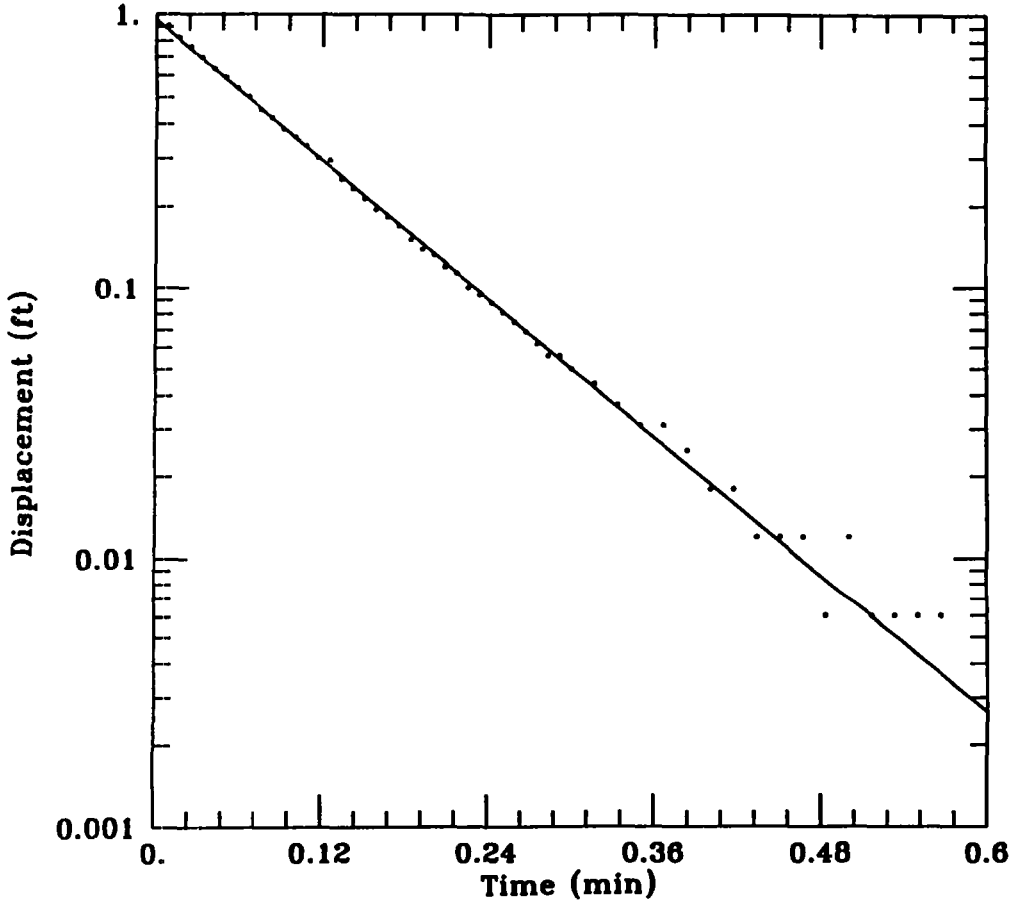
TEST DATA:
H0 = 0.793 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 110.3 ft
H = 18.08 ft

PARAMETER ESTIMATES:
K = 0.008375 ft/min
y0 = 0.8015 ft

Figure 1 UA-32 Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
UA32RH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 19, 1996

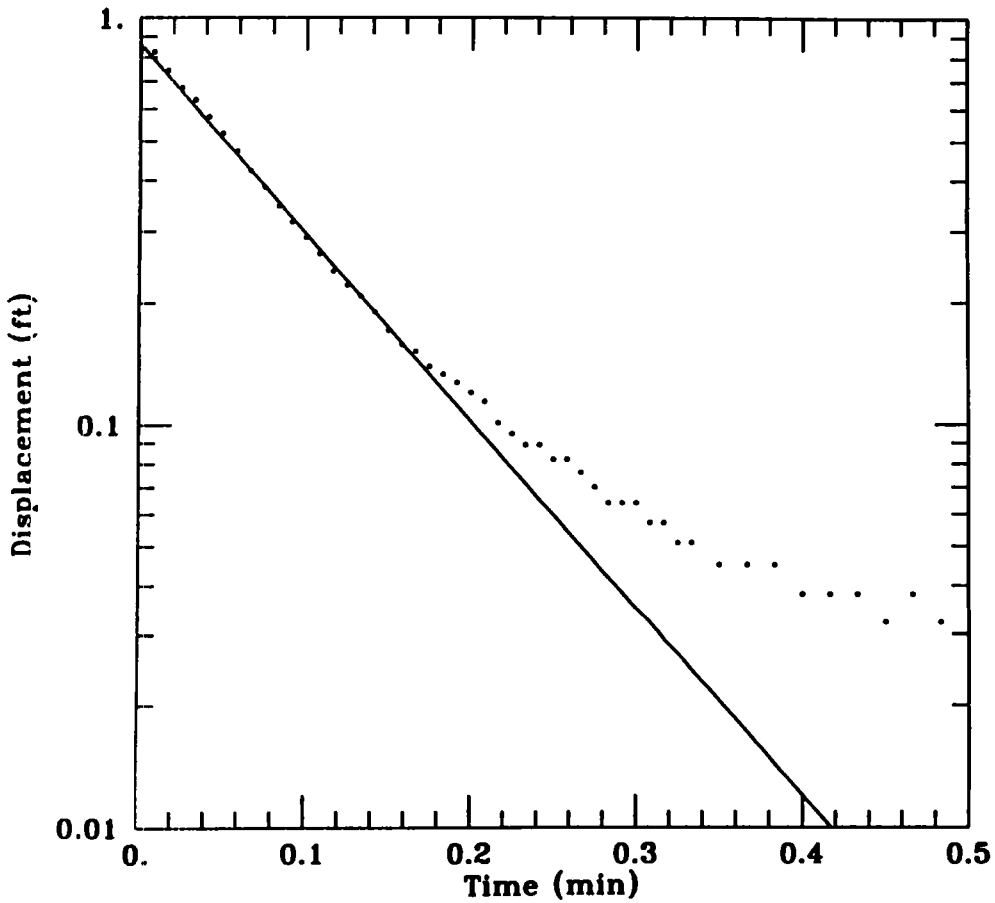
TEST DATA:
H0 = 1.005 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 110.3 ft
H = 18.08 ft

PARAMETER ESTIMATES:
K = 0.008577 ft/min
y0 = 0.9516 ft

Figure 2 UA-32 Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
UA105FH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 17, 1996

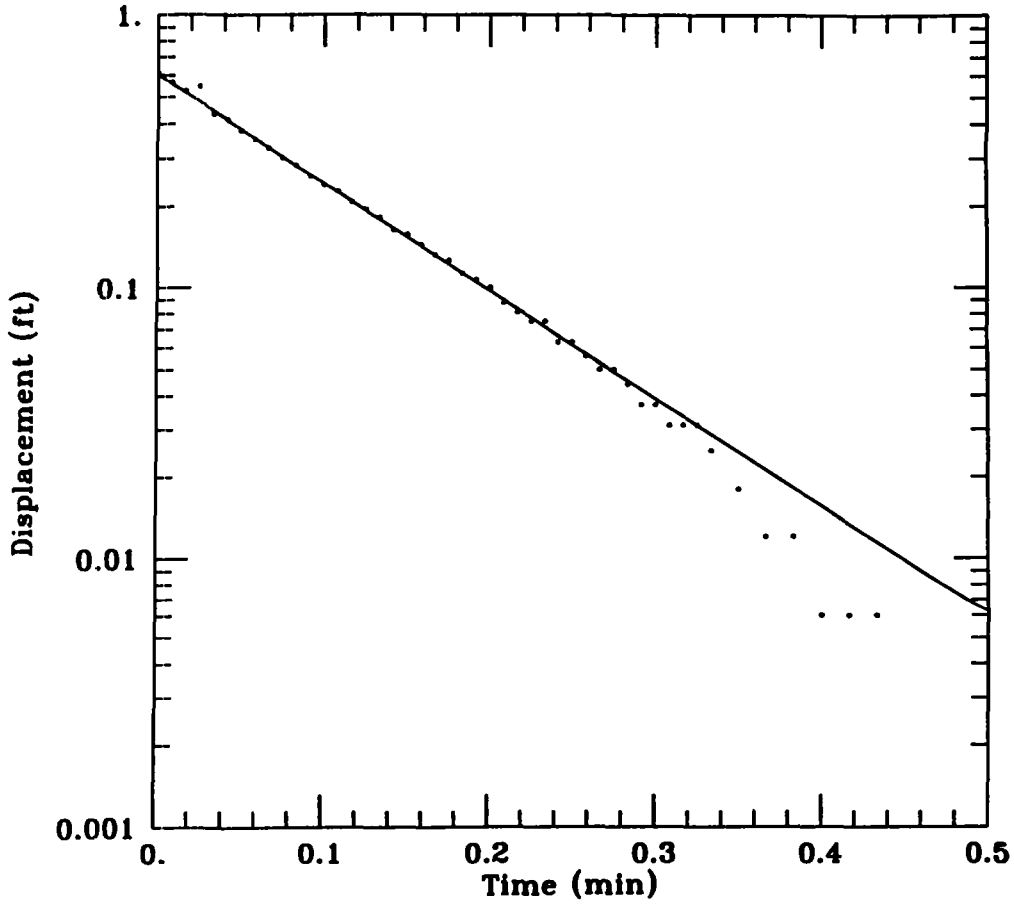
TEST DATA:
H0 = 0.826 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 98.73 ft
H = 20.52 ft

PARAMETER ESTIMATES:
K = 0.009565 ft/min
y0 = 0.8629 ft

Figure 3 UA-105 Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
UA105RH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 17, 1996

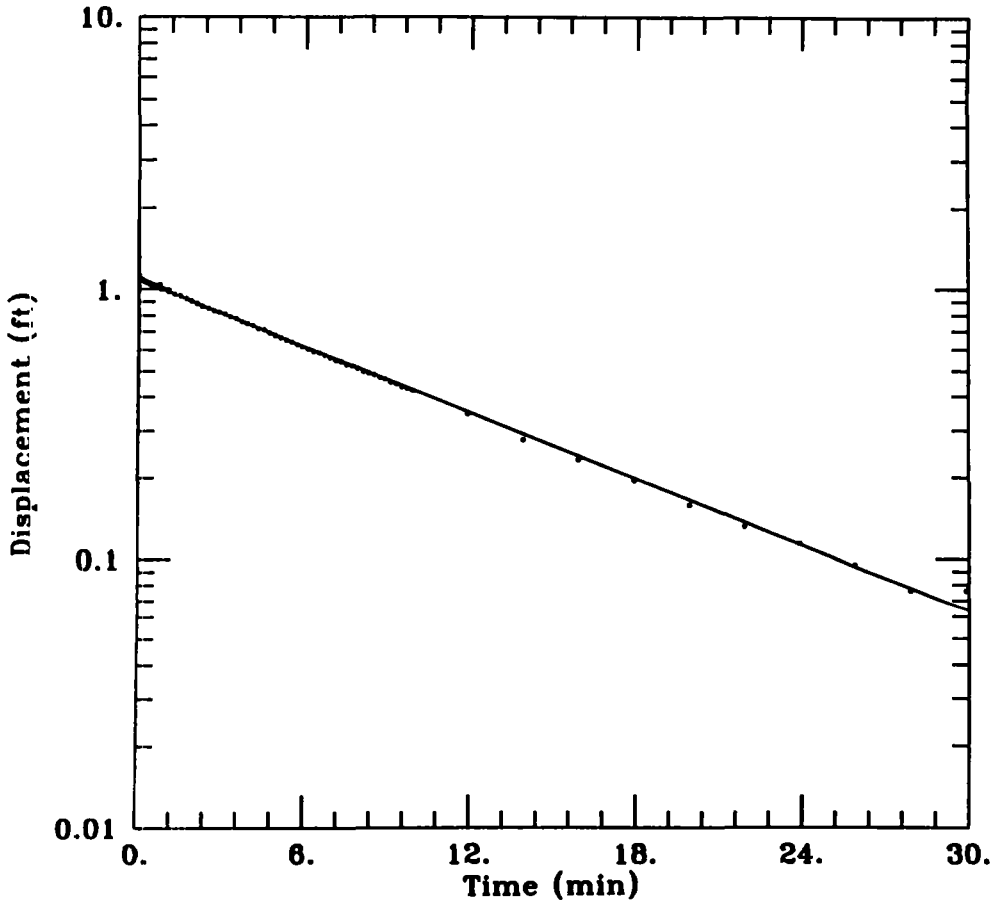
TEST DATA:
H0 = 0.611 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 98.73 ft
H = 20.52 ft

PARAMETER ESTIMATES:
K = 0.008185 ft/min
y0 = 0.6038 ft

Figure 4 UA-105 Rising Head Slug Test

Client: ***IDEM***	Company: ***Camp Dresser & McKee Inc.***
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA101CFH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 18, 1996

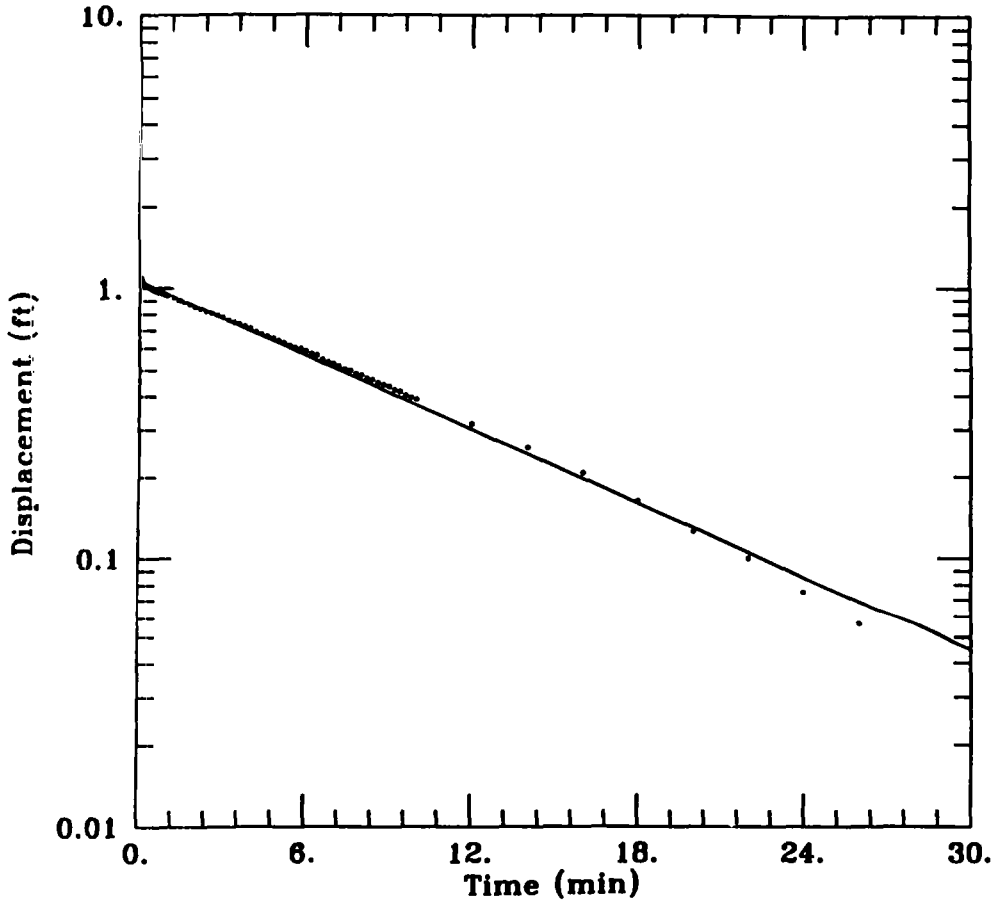
TEST DATA:
H0 = 1.308 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 101.5 ft
H = 73.39 ft

PARAMETER ESTIMATES:
K = 0.0001028 ft/min
y0 = 1.083 ft

Figure 5 LA-101C Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA101CRH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 18, 1996

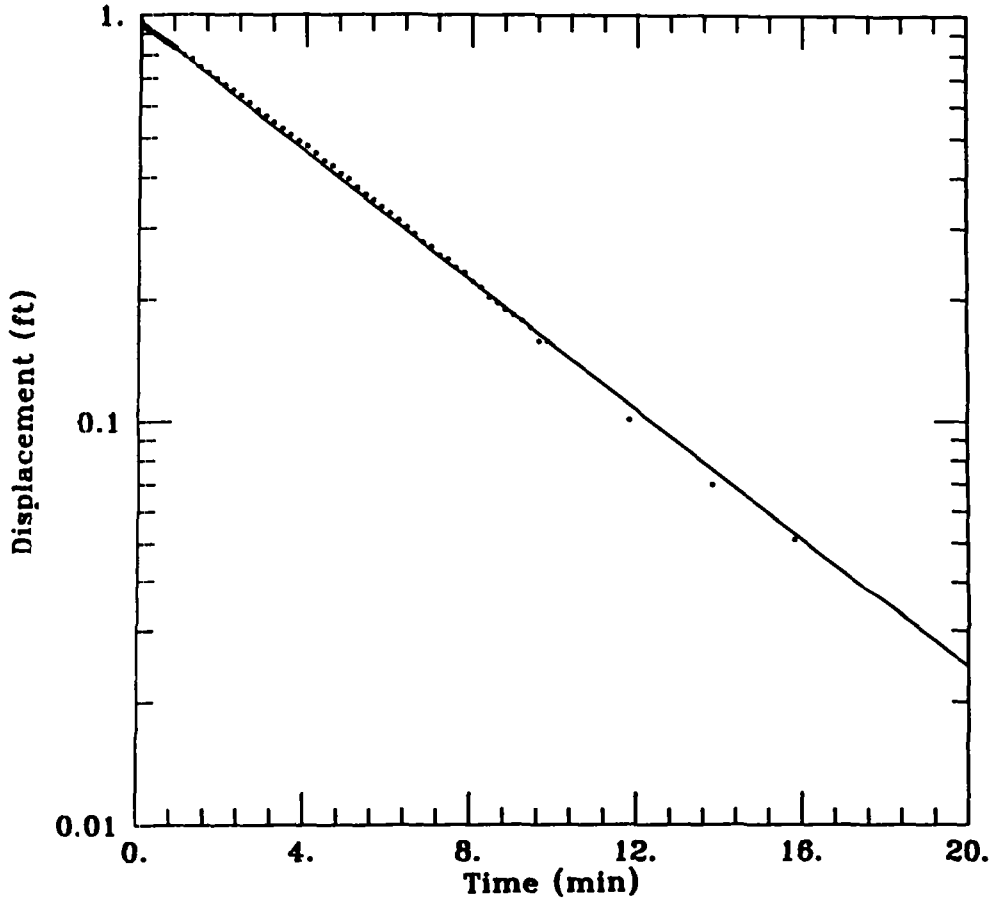
TEST DATA:
H0 = 1.174 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 101.5 ft
H = 73.39 ft

PARAMETER ESTIMATES:
K = 0.0001143 ft/min
y0 = 1.058 ft

Figure 6 LA-101C Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA102CFH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 19, 1996

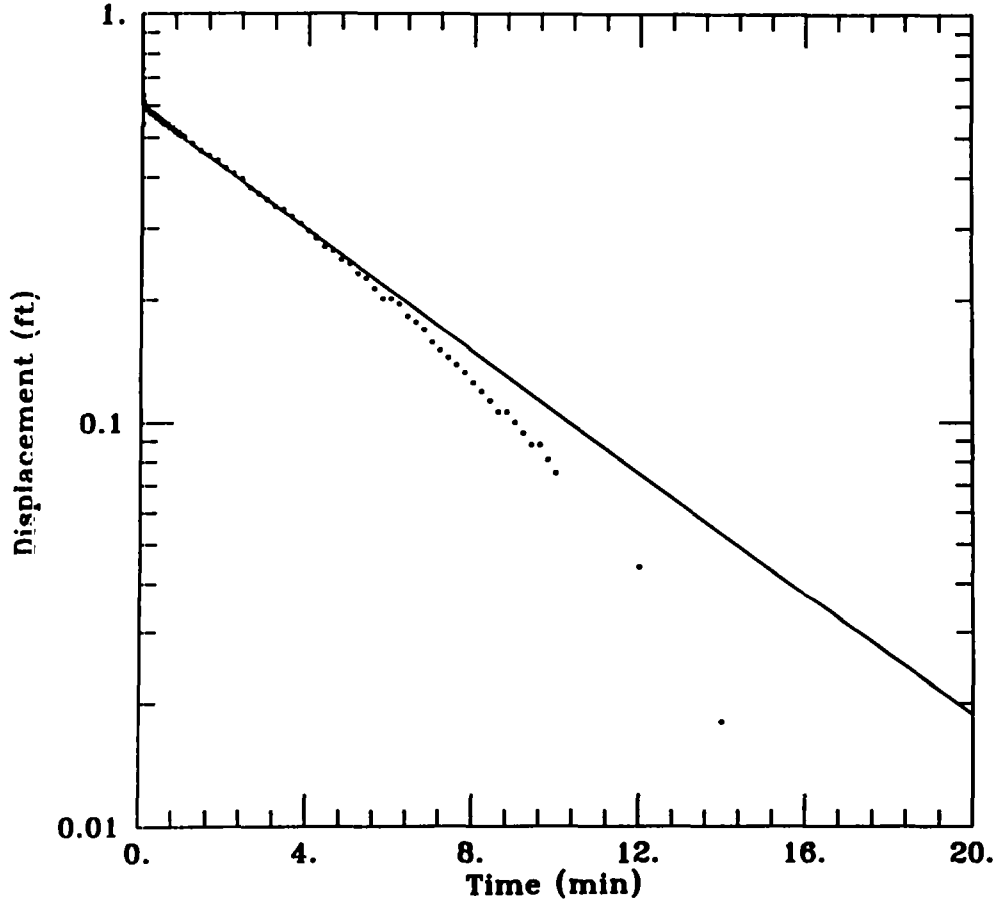
TEST DATA:
H0 = 0.969 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 100.4 ft
H = 47.56 ft

PARAMETER ESTIMATES:
K = 0.0001862 ft/min
y0 = 0.9649 ft

Figure 7 LA-102C Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA102CRH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 19, 1996

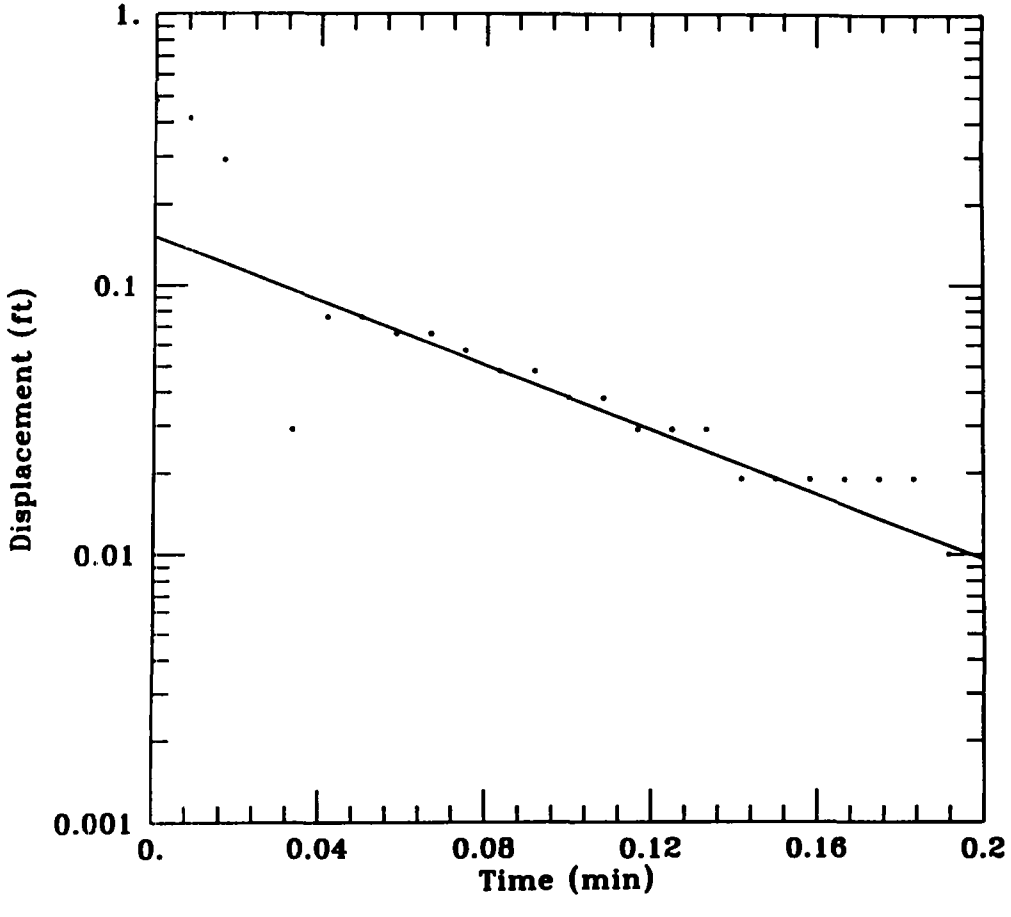
TEST DATA:
H0 = 0.735 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 100.4 ft
H = 47.56 ft

PARAMETER ESTIMATES:
K = 0.0001747 ft/min
y0 = 0.5903 ft

Figure 8 LA-102C Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA105CFH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 17, 1996

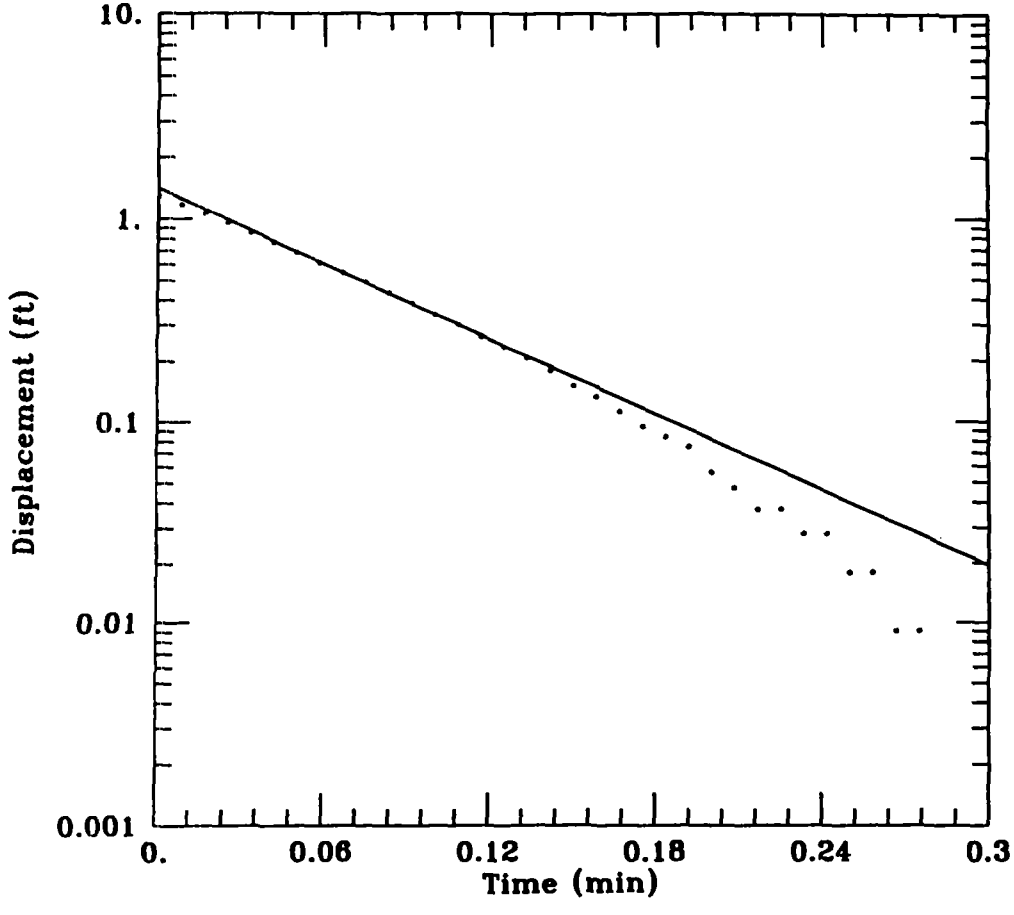
TEST DATA:
H0 = 0.481 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 82.56 ft
H = 32.5 ft

PARAMETER ESTIMATES:
K = 0.01337 ft/min
y0 = 0.1518 ft

Figure 9 LA-105C Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA105CRH.DAT
05/22/96

AQUIFER MODEL:
Unconfined

SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 17, 1996

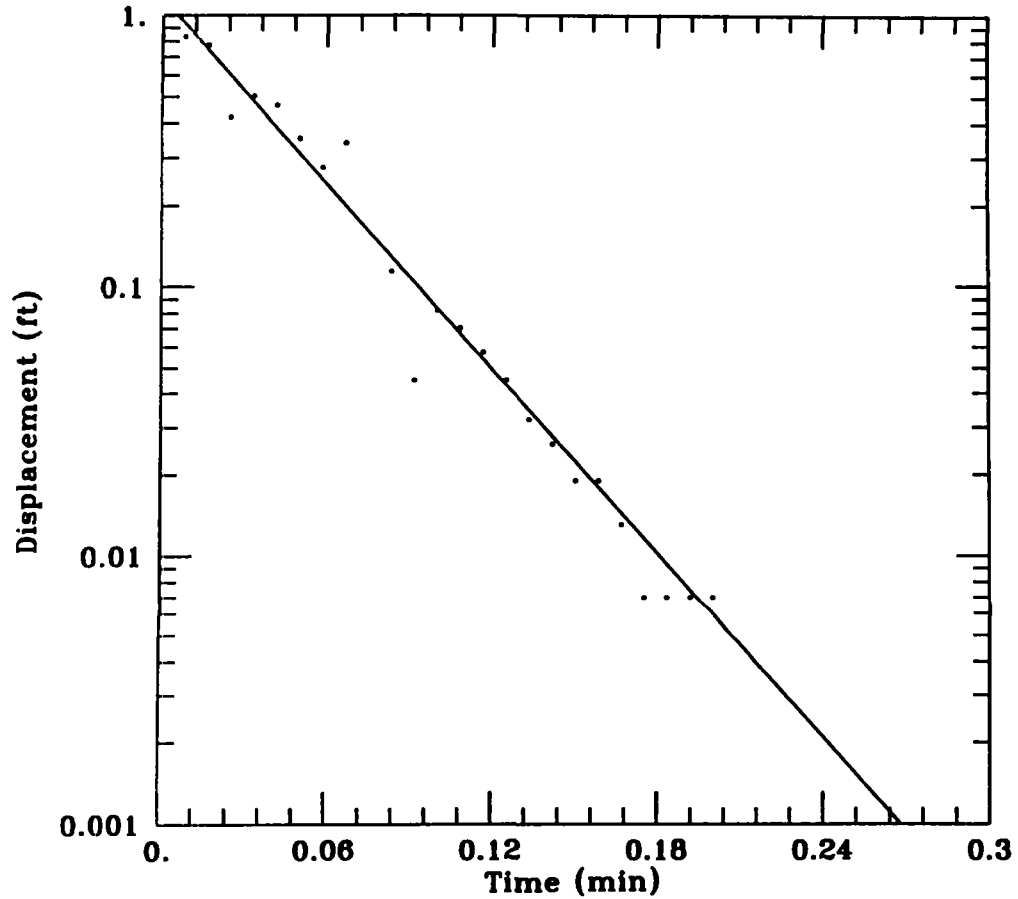
TEST DATA:
H0 = 1.289 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 82.56 ft
H = 32.5 ft

PARAMETER ESTIMATES:
K = 0.01381 ft/min
y0 = 1.413 ft

Figure 10 LA-105C Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA106CFH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 20, 1996

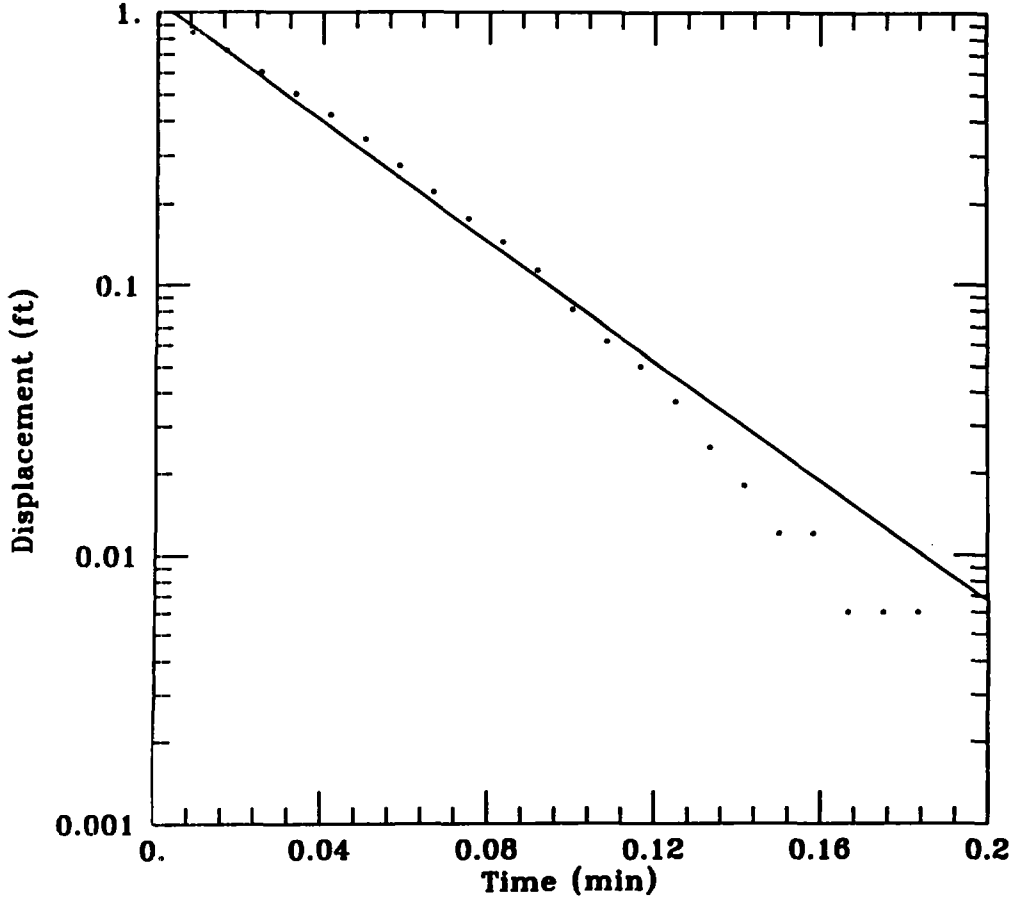
TEST DATA:
H0 = 0.837 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 97.23 ft
H = 42.08 ft

PARAMETER ESTIMATES:
K = 0.02623 ft/min
y0 = 1.157 ft

Figure 11 LA-106C Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA106CRH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 20, 1996

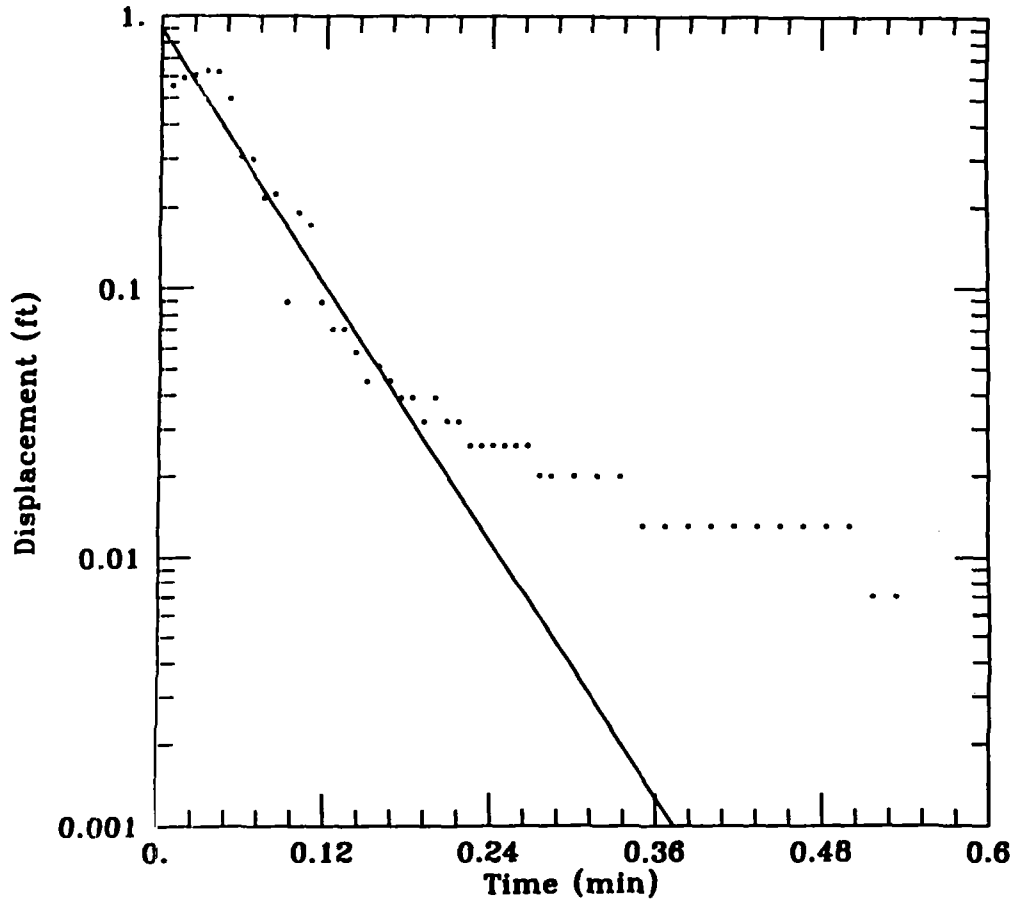
TEST DATA:
H0 = 0.968 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 97.23 ft
H = 42.08 ft

PARAMETER ESTIMATES:
K = 0.0254 ft/min
y0 = 1.1 ft

Figure 12 LA-106C Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA107CFH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 19, 1996

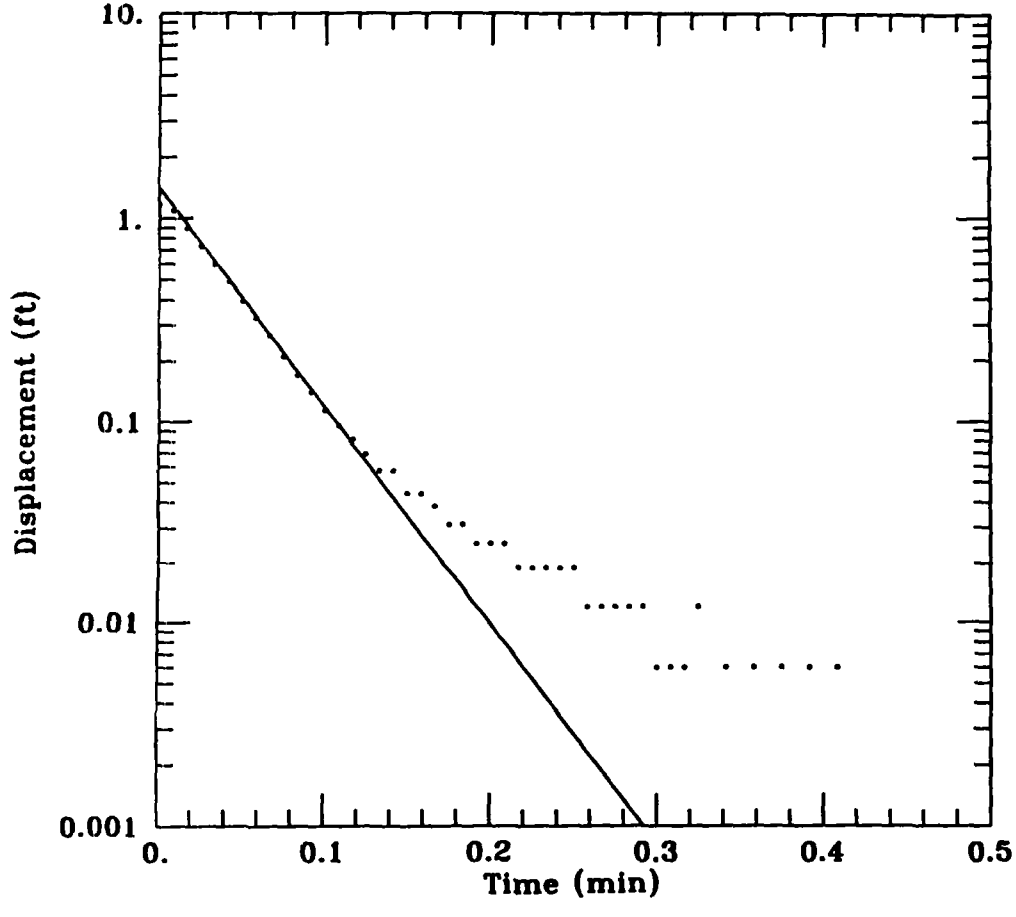
TEST DATA:
H0 = 0.635 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 70.06 ft
H = 30.36 ft

PARAMETER ESTIMATES:
K = 0.01762 ft/min
y0 = 0.8977 ft

Figure 13 LA-107C Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA107CRH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 19, 1996

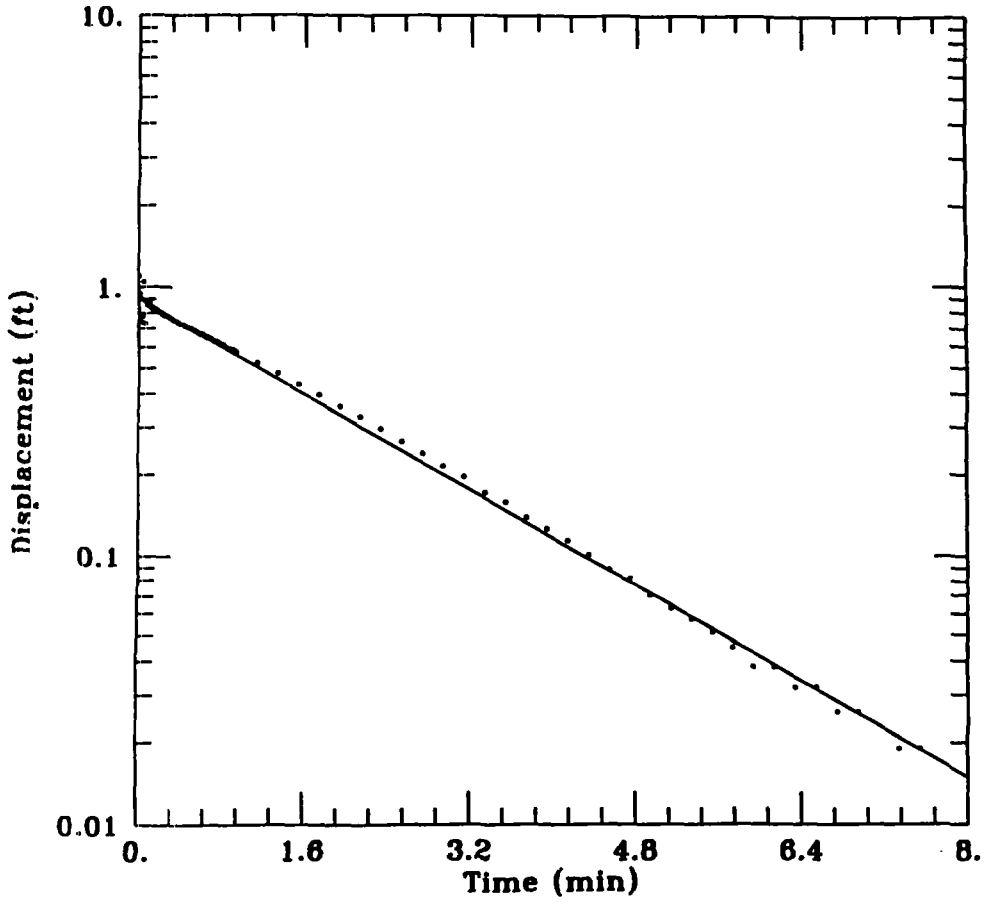
TEST DATA:
H0 = 1.174 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 10. ft
b = 70.06 ft
H = 30.36 ft

PARAMETER ESTIMATES:
K = 0.024 ft/min
y0 = 1.413 ft

Figure 14 LA-107C Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA104EFH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 20, 1996

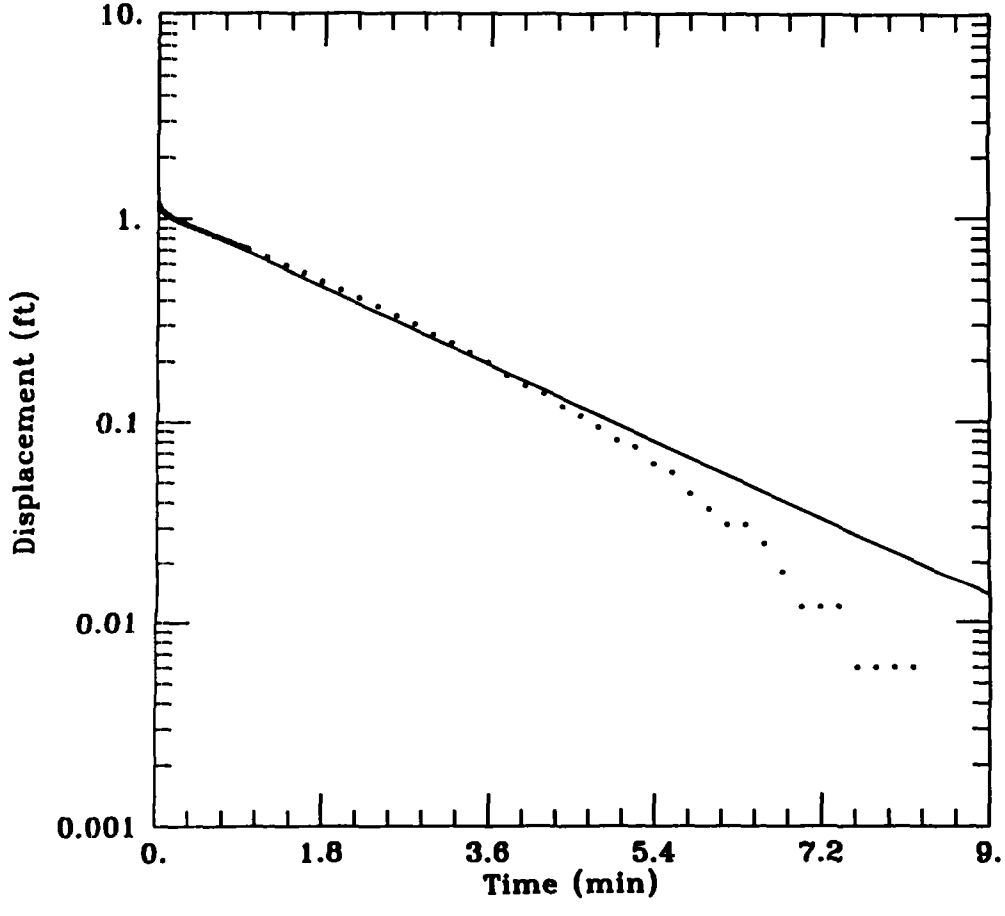
TEST DATA:
H0 = 1.096 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 20. ft
b = 74.82 ft
H = 70.1 ft

PARAMETER ESTIMATES:
K = 0.0003303 ft/min
y0 = 0.9063 ft

Figure 15 LA-104E Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA104ERH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 20, 1996

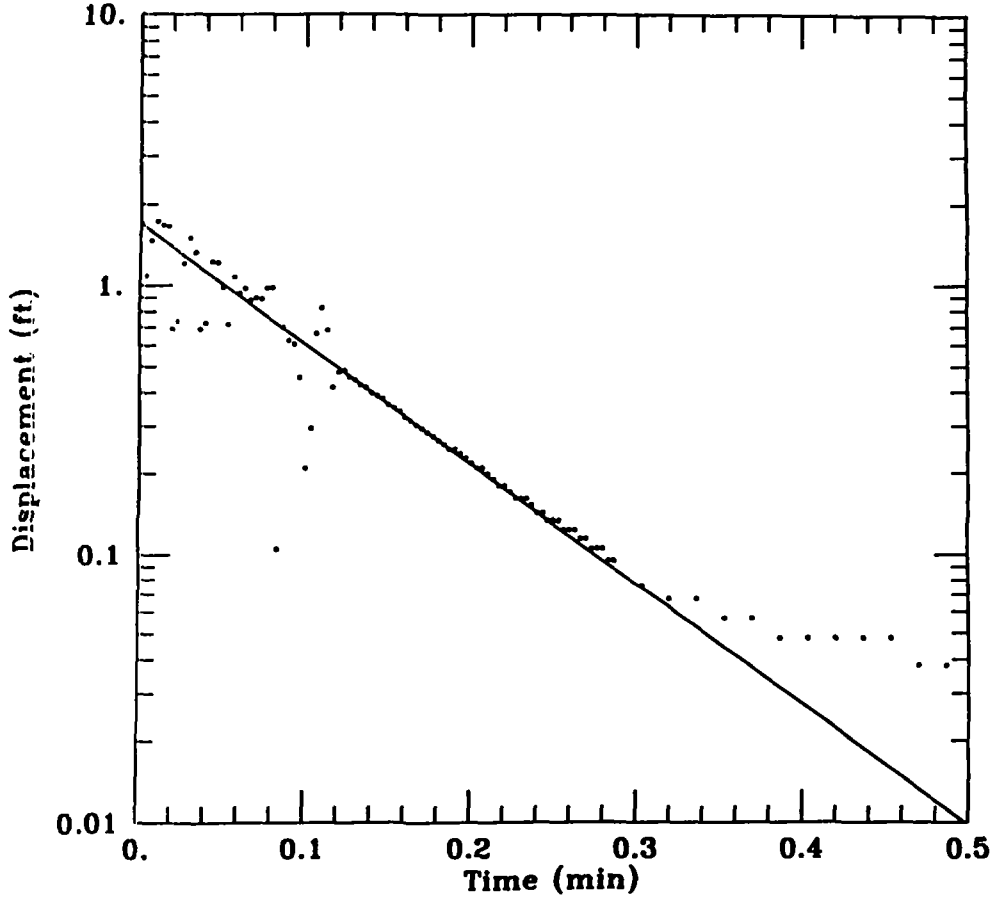
TEST DATA:
H0 = 1.183 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 20. ft
b = 74.82 ft
H = 70.1 ft

PARAMETER ESTIMATES:
K = 0.0003133 ft/min
y0 = 1.098 ft

Figure 16 LA-104E Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA105EFH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 17, 1996

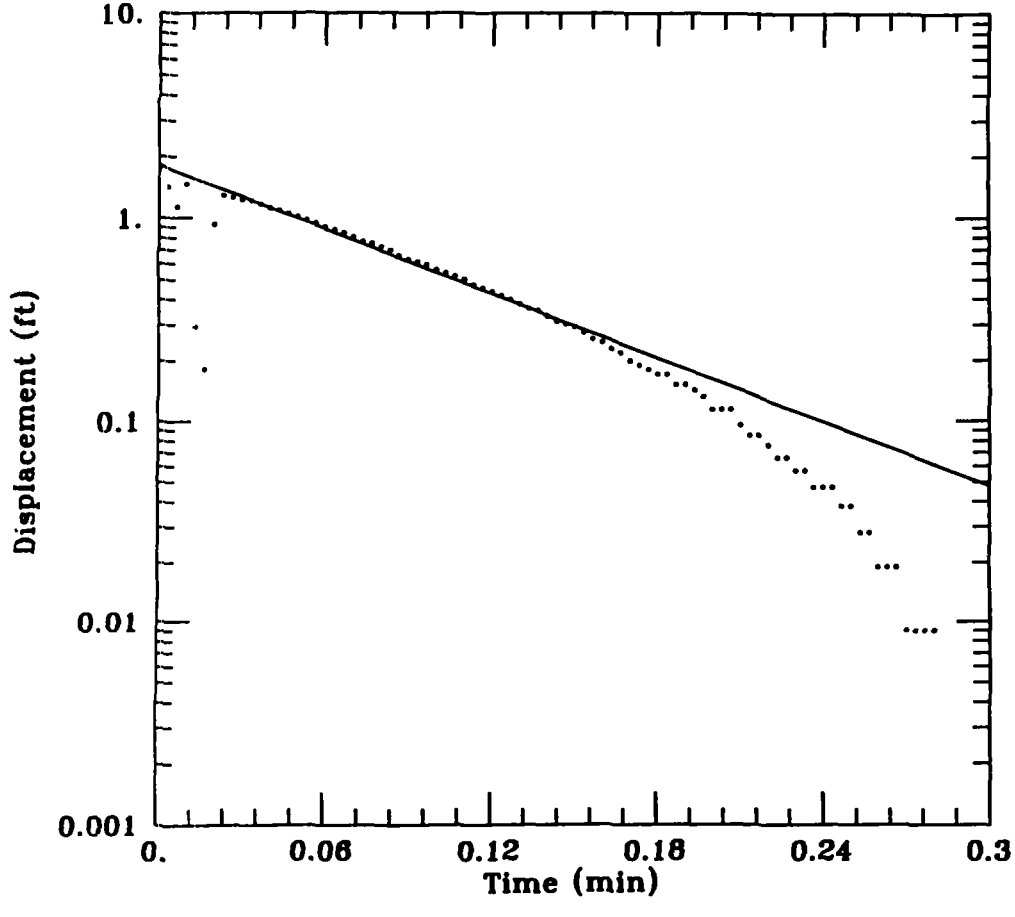
TEST DATA:
H0 = 1.694 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 20. ft
b = 60.26 ft
H = 59.75 ft

PARAMETER ESTIMATES:
K = 0.006941 ft/min
y0 = 1.698 ft

Figure 17 LA-105E Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA105ERH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 17, 1996

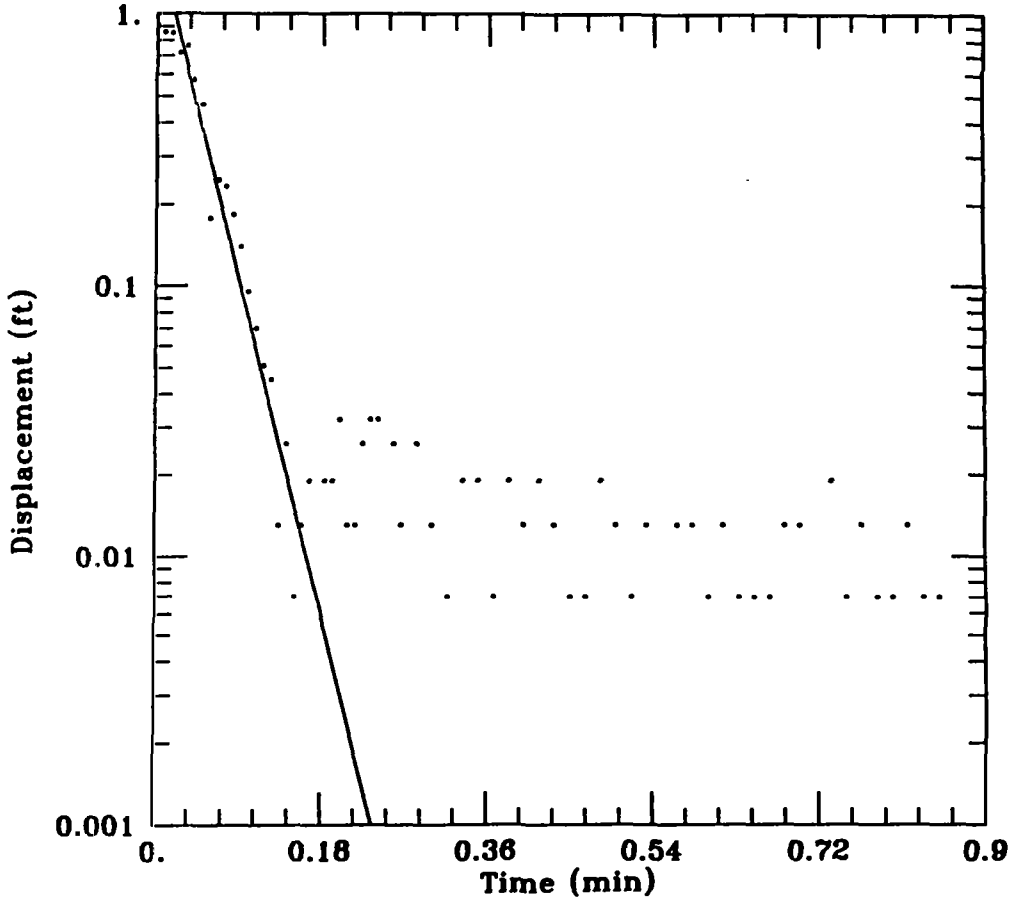
TEST DATA:
H0 = 1.778 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 20. ft
b = 60.26 ft
H = 59.75 ft

PARAMETER ESTIMATES:
K = 0.008162 ft/min
y0 = 1.817 ft

Figure 18 LA-105E Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA107EFH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 19, 1996

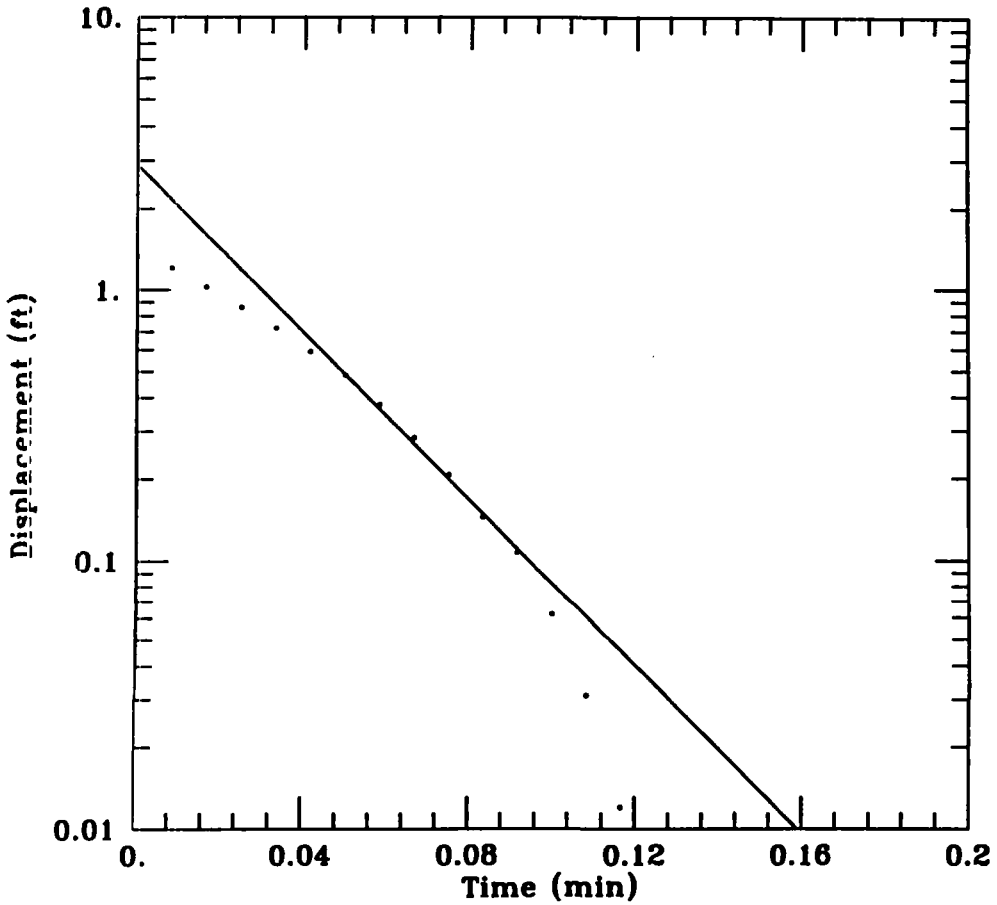
TEST DATA:
H0 = 0.913 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 20. ft
b = 61.96 ft
H = 61.89 ft

PARAMETER ESTIMATES:
K = 0.02299 ft/min
y0 = 1.833 ft

Figure 19 LA-107E Falling Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV



DATA SET:
LA107ERH.DAT
05/22/96

AQUIFER MODEL:
Unconfined
SOLUTION METHOD:
Bouwer-Rice

PROJECT DATA:
test date: January 19, 1996

TEST DATA:
H0 = 1.328 ft
rc = 0.0833 ft
rw = 0.26 ft
L = 20. ft
b = 61.96 ft
H = 61.89 ft

PARAMETER ESTIMATES:
K = 0.0257 ft/min
y0 = 2.89 ft

Figure 20 LA-107E Rising Head Slug Test

Client: **IDEM**	Company: **Camp Dresser & McKee Inc.**
Location: **CSSS, Kokomo, Indiana**	Project: **2673**

AQTESOLV

Figure 21
Hydraulic Conductivity at Midpoint of Screened Elevation
ABB-ES 1993 and CDM 1995
Continental Steel Superfund Site, Kokomo, Indiana